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**REPORT TO THE  
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
ON THE LAW OF OUTER SPACE**



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REPORT TO THE  
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
ON THE LAW OF OUTER SPACE

Project Reporters for  
The American Bar Foundation

→ Leon Lipson *and*  
Nicholas deB. Katzenbach

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## TABLE OF CONTENTS

Preface	i
Foreword	1
A. Acknowledgements	1
B. Scope and Arrangement of Research	1
1. Analysis	1
2. Abstracts	2
3. Indexes	2
4. Table, Abstract-to-Source and Abstract-to-Footnotes	3
5. Bibliography	3
I. Analysis	4
A. General Problems	4
1. Introduction	4
a. Background of Legal Writing	4
b. Pertinent Factual Developments	6
2. Problems of Sovereignty	10
a. Sovereignty over Air Space	10
b. The Boundary Between Air Space and Space	14
c. Sovereignty over Bodies in Space	22
d. Conflict of Laws	25
3. The Legal Status of Space	26
a. General Observations	26
b. The Problem of "Peaceful Purposes": Military Uses	29
B. Selected Legal Problems Arising from Space Activities	32
1. Radio Spectrum Management	33
2. Conservation of Space	34
3. Radio and Television Relay Satellites	35



4. Weather Forecasting and Control	35
5. Damage to Subjacent States, Aircraft and Vessels: Safety Standards	36
6. Repossession of Space Projectiles and Repatriation of Personnel	36
7. Observation Satellites	37
8. Co-ordination of Space Programs	37
C. International Organization for Space Activities and Space Law	38
II. Abstracts	42
A. Direct Discussion of Space Law	43
B. Writings of Collateral Relevance to Space Law	129
III. Indexes	147
A. To Abstracts of Direct Discussions of Space Law	147
B. To Abstracts of Writings of Collateral Relevance to Space Law	163
IV. Abstract-to-Source and Abstract-to-Footnote Table	167
V. Bibliography and Source-to-Abstract Table	176
VI. Supplementary Bibliography	205

## PREFACE

The American Bar Foundation deems it a privilege to publish as a Foundation volume this "Report to the National Aeronautics and Space Administration on the Law of Outer Space." The document prepared by Professors Leon Lipson of Yale Law School and Nicholas deB. Katzenbach of the University of Chicago Law School, under the guidance of the Advisory Committee, is, we believe, a valuable and scholarly contribution to the ever expanding volume of literature on the subject.

Shortly after the launching of the first artificial satellite in 1957, the American Bar Association, through its Section of International and Comparative Law, formed a Special Committee on Law of Outer Space. David F. Maxwell, Esquire, a past President of the Association, was named its Chairman; its membership included leading authorities in the United States on international law, air law, and space law, as well as certain government officials with responsibilities for legal aspects of space programs. In 1958, the Committee, noting the existence of a growing body of information and scholarly writing on space law, suggested the need of a systematic survey of the literature as a first step toward developing recommendations with regard to a law of outer space. The Committee recommended that the American Bar Foundation undertake that survey.

Early in 1959, the Foundation entered into a contract with the National Aeronautics and Space Administration whereby the Foundation undertook to "conduct research on the law of outer space, including, but not limited to review and analysis of all available space literature and proposals which have been made for the control and administration of outer space activities." The Board of Directors of the Foundation designated the American Bar Association Section Committee on Law of Outer Space as an Advisory Committee to the project, and appointed Professors Lipson and Katzenbach as Project Reporters in charge of conducting the research.

This Report sets forth the results of the research performed under the contract. Professors Lipson and Katzenbach have been assisted in the task by Roger H. Bernhardt, J. Lani Bader, Eliezer Erel, and Mrs. Sybille Fritzsche, all members of the Foundation staff. The abstracts of the literature and the final Index were largely the work of Messrs. Bader and Bernhardt. Mr. Bader took responsibility for preparing the Tables and Bibliography.

The Board of Directors and staff of the Foundation wish to express their very sincere appreciation to those who have helped in bringing this task to completion, -- to the authors for their dedicated service and their scholarly product, to the Advisory Committee for its guidance and helpful suggestions, to the research staff for its diligent service, and to the National Aeronautics and Space Administration for its encouragement and support.

Attention should be called to the fact that the law of outer space is not only far from being an exact science, but in many of its aspects it is still in a highly controversial state. In view of this fact, no attempt has been made to obtain Committee approval of the Report or its contents. The Committee members do not assume responsibility for any of the positions taken by the Reporters. These responsibilities are assumed by the Reporters themselves. All are agreed, however, upon the high scholarly quality of the Report, and the American Bar Foundation is proud to publish it as a worthy addition to the literature of a new, fascinating and fluid field of the law.

Chicago, Illinois  
October 18, 1960

E. BLYTHE STASON  
Administrator

## FOREWORD

### A. Acknowledgements

This report was prepared in 1959 and 1960 for the American Bar Foundation at the request and with the support of the National Aeronautics and Space Administration. The Reporters desire to acknowledge their gratitude to those who furnished research assistance, in particular to Mr. J. Lani Bader for persevering diligence and many helpful suggestions. The Reporters also owe a debt to the guidance of the Advisory Committee, under the chairmanship of Mr. Maxwell; the Committee, and many of its members as individuals, have contributed to the research, uncovering materials, providing suggestions, and making thoughtful comments on form and substance.<sup>1/</sup>

### B. Scope and Arrangement of Research

The report is divided into five sections: (1) Analysis of existing literature, (2) Abstracts of space law literature and proposals, (3) Index, (4) Table, abstract-to-source and abstract-to-footnote, and (5) Bibliography with source-to-abstract table. Each requires a word of explanation.

#### 1. Analysis

This section contains a general description of existing literature, analyses of various proposals, and an appraisal of the present status of the law of outer space and problems that will have to be resolved. At many points it follows closely the 1959 Report of the ABA Committee on Law of Outer Space. That Report was drawn up by the present Reporters in the course of their work on this project. It can be found printed, in the form approved by the Committee and accompanied by comments from some of the other members of the Committee.<sup>2/</sup>

The section on Analysis contains a description and discussion of existing literature on space law; it is not designed as an independent monograph. It is annotated to the literature abstracted in the second section of this Report. The presence of a footnote reference to the serial number of an abstract, or to the work itself by title or number, means that the items to which reference is made are, taken as a whole, relevant to the text at that point, but it is not necessarily intended to claim that the item "supports" a position taken in the text. Footnotes have been, for the most part, restricted to abstract numbers for two reasons: (a) traditionally complete citation would have extended the length of the analysis section unduly for the casual reader, while the

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<sup>1/</sup> Mr. Lipson wishes also to record his appreciation of the help and facilities furnished to him by the RAND Corporation in the course of related work in which he has been engaged as Consultant.

<sup>2/</sup> See American Bar Association, Section of International and Comparative Law, 1959 Proceedings 215-33 (1960).

reader interested in pursuing sources can find them without difficulty by using the indices and tables; (b) the Reporters wished to convey by the abstracting device a fair impression of the positions taken in the literature, unclouded by admixture with possibly controversial positions of their own.

## 2. Abstracts

This section contains brief summaries of the points made in the writings read in the project. It does not purport to be an adequate substitute for the original writings. It is designed to give the reader a fair general idea of what has been said in the cited source on a given problem so that he may look at the original if it seems to fall within his area of interest. The abstracts have been arranged under alphabetically organized headings for topics and sub-topics; the reader who is interested in (say) "sovereignty over air space" may get an idea of what the cited writers have said in this connection by turning to the abstracts under the appropriate head.

The abstracts have been further divided into two general sections. Section A contains abstracts of writings that have directly discussed problems of space law; Section B contains abstracts of some writings that have discussed either the technical aspects of space and astronautics or areas of law, such as air law, that are closely relevant to space problems. Although the writings abstracted in Section B do not, as a rule, contain explicit reference to space law problems, they provide an invaluable background for one interested in a complete understanding of the problems discussed in the literature on space law itself.

In making extremely brief summaries of the main ideas contained in the literature, the abstractors have made every effort to be accurate. It must be repeated that the reader cannot regard a brief abstract, or even a set of abstracts, as a substitute for reading the more detailed discussion contained in the original work. The number of abstracts devoted to a particular source is not to be taken as a guide to the Reporters' appraisal of the importance of the source; it depended on many factors, including the scope and style of the article and the relationship of the article to other writings by the same author.

## 3. Indexes

The two indexes contained in Part III list the topics discussed in the abstracts. Index A refers to the abstracts that contain direct discussions of the problems of space law, and Index B refers to the abstracts of writings that are closely relevant to the problems of space law. One may use the indexes to go from relevant topic to the appropriate abstracts; from there the reader, by using the abstract-to-footnote or abstract-to-source table, may go to the titles of the original writings or to the pertinent places in the Analysis.

4. Table, Abstract-to-Source and Abstract-to-Footer

Once the reader has located the numbers of the abstracts that discuss a topic, he may find the pertinent place in the Analysis where that topic is discussed or the title of the original writings by using the abstract-to-source and abstract-to-footnote table found in Part IV. If, for instance, he is interested in the impact of the X15 on existing boundary proposals, Index A will show him that that topic is discussed in Abstracts 553 and 643. By looking up abstract numbers 553 and 643 in the abstract-to-source and abstract-to-footnote table, he will see that those two abstracts are summaries of articles by Cooper and Quigg, and that they pertain to Analysis text at footnotes 30, 45, 54, and 70.

5. Bibliography

The main bibliography lists every work that has been read and abstracted. It has taken advantage of the two principal bibliographies available at the time the research was designed; Hogan, John C., "A Guide to the Study of Space Law," 5 St. Louis U.L.J. 79, 108-33 (1958), and U. S. Congress, House of Representatives, "Survey of Space Law," Staff Report of the Select Committee on Astronautics and Space Exploration, 38-60 (1958). It was not possible to adhere to a single cut-off date. In general, the bibliography was relatively comprehensive up to November 1958; about a dozen later works were abstracted and are listed in the main bibliography. A supplementary bibliography, without source numbers, is included to give a list of some of the most significant recent writings, but detailed treatment of the contents must await some later analysis.

## I. ANALYSIS

### A. General Problems

#### 1. Introduction

##### a. Background of Legal Writing

Before the successful orbiting of Sputnik I in October 1957, legal scholars gave relatively little consideration to the problems that would accompany man's entry into outer space. Works on aviation law made occasional mention of the possibility of flight at very high altitudes and of artificial satellites, but only a handful of experts, with interest in aviation, astronautics or international organization, had the vision to see and forecast publicly some of the difficult and important questions that would soon have to be faced by lawyers and statesmen. Among the most notable of these were Cooper, Haley, Schachter, Bornecque, Mandl and Meyer.<sup>3/</sup> Since 1957, the streams of legal literature, fed by the general interest in space science and the political and military significance of space activities, have been flowing more abundantly, and considerable interest has been shown by the organized Bar, governments, and universities in many countries.

The great bulk of legal writing has been patterned closely on the ideas put forward by the earlier scholars. While particular proposals, solutions and argumentation have differed, much of the literature revolves around the problems of "sovereignty" posed by Cooper and others in the early literature. Almost all the writers have taken as a starting point universal agreement that national sovereignty extends to "air space". They have posed as central and important questions the following: (1) Does "air space" (or does national sovereignty) extend indefinitely out from the earth's surface?<sup>4/</sup> (2) If it does not, at what point does it end?<sup>5/</sup> (3) What is the legal status of space beyond air space?<sup>6/</sup> (4) May a state acquire sovereignty over artificial<sup>7/</sup> or natural<sup>8/</sup> bodies in space and, if so, how?

A second area of legal problems explored in the literature virtually from the outset concerns the liability of states conducting space activities for damage to persons and property in other states or elsewhere.<sup>9/</sup> The factual

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<sup>3/</sup> See sources 29, 30, 51, 52, 93, 103, 177-79.

<sup>4/</sup> (Note: Numbers given in footnote references without special designation refer to the abstracts reproduced in Section II below.) E.g., 540-48.

<sup>5/</sup> E.g., 588-606.

<sup>6/</sup> E.g., 644-726.

<sup>7/</sup> E.g., 473-95.

<sup>8/</sup> E.g., 196-245.

<sup>9/</sup> E.g., 411-31.

hypothesis most commonly put forward is that of a misfired or runaway rocket, and the legal question most often treated is whether liability for unintentional damage depends on a showing of negligence.

A third area of legal problems was identified somewhat later in the literature and even yet has not, perhaps, been thoroughly explored. This is the problem of deciding whether, and how, to limit the use of space to "peaceful purposes".<sup>10/</sup> It entails questions of interpretation of the United Nations Charter and the possibility of various forms of international regulation or control of space activities. In part this problem is related to the question of the meaning and range of sovereignty.

With the advance of space science and technology, and increased public knowledge and discussion of various potential uses of space, legal problems related to particular uses have come to be more fully discussed than before. For example, the allocation of radio frequencies to countries on a geographical formula has not been adaptable to communication with satellites which rapidly move through existing radio-frequency regions;<sup>11/</sup> the possibility of using satellites for meteorological purposes has suggested the need for legal rules governing the dissemination of weather information and, eventually, for the control of weather control;<sup>12/</sup> the possibility of observing activities on the ground (or elsewhere) from space has raised the question whether such observation could be considered unlawful<sup>13/</sup> -- a question made sharper by the U-2 incident of May 1, 1960 and Soviet charges of U.S. "aggression" in the Security Council. But, as compared with the literature dealing with problems of sovereignty, discussions of particular legal arrangements to deal with defined space activities are meager.

Finally, crossing all these problems, are the questions how to proceed to develop a law of outer space and how to make that law effective. Here the writers diverge as to the desirability of international agreement,<sup>14/</sup> the matters on which agreement should be sought,<sup>15/</sup> the likely or desirable forms of agreement,<sup>16/</sup> and the role of existing or new international organizations or agencies.<sup>17/</sup> Discussion of these problems has been given additional

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<sup>10/</sup> E.g., 440-53, 455.

<sup>11/</sup> 28, 44, 142; see Radio Frequency Control in Space Telecommunications, 86th Cong., 2d Sess. (prepared by Edw. Wenk, Jr.), esp. pp. 1-3, 89-99 (Mar. 19, 1960).

<sup>12/</sup> 17, 28, 141.

<sup>13/</sup> 496-500.

<sup>14/</sup> 128-52, 178-95.

<sup>15/</sup> 75-87.

<sup>16/</sup> 104-9.

<sup>17/</sup> 29-74.

impetus by the progress of space activities in quantity and quality, the increasingly apparent military and economic significance of various activities and the scientific knowledge derived from them, the extent to which lawyers and scientists interested in space problems have organized themselves on national and international lines, and the discussion of both scientific and legal problems in the United Nations.

b. Pertinent Factual Developments

While this is not the place for a narrative of man's activities in space, we ought to take brief note of some of the more important events that have affected the legal literature. At present, the two "space powers" are the Soviet Union and the United States. Their prowess has been stimulated by, and used in, the Cold War. Whether or not outer space can be described today as a theater of potential military action (if we leave to one side the temporary presence of ballistic missiles at very high altitudes), the technical feasibility of some military use of outer space is taken more and more seriously in statements by officials, scientists, engineers, and journalists. In a broader sense of the term "military," the Soviet Union has exploited its space prowess intensively for Cold-War advantage. Expressions of hope that space could be somewhat divorced from international politics have been disappointed, as they were doomed to be.<sup>18/</sup>

From the beginning of man's activity in outer space, and even before it began, the United States has cherished and expressed the hope that outer space could be devoted exclusively to peaceful uses. As early as January, 1957, the United States urged in the United Nations that studies on space disarmament be undertaken without delay.<sup>19/</sup> In August, 1957, our Government was joined by Canada, France, and the United Kingdom in proposing a technical committee in the U.N. to study the creation of a system of inspection that could effectively insure that objects would be sent through space for peaceful purposes only. These initiatives, it may be noted, preceded the first successful launchings of artificial satellites. The approach was endorsed by the United Nations General Assembly on November 14, when it adopted Resolution 1148 (XII). Again, in January, 1958, immediately after the launching of Explorer I, President Eisenhower began his correspondence with Bulganin aimed at the solution of the sensitive and difficult disarmament problem connected with space activities.

Official spokesmen have been generally cautious in stating principles of a law of space. Awareness of military potential may have dictated circumspection before the advocacy of rules that might inhibit activities regarded as essential to national security or might at some future time favor one of the space powers over another in ways yet unforeseen. The problem has been made even more complicated by the fact that space technology is in a state of rapid development and it is difficult to arrive today at conclusions one can be confident will long endure.<sup>20/</sup> Furthermore, it is difficult to devise a workable

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<sup>18/</sup> 614-32.

<sup>19/</sup> 441, 444.

<sup>20/</sup> Cf. 180, 184, 192; but cf. 185, 187-88.



formula to segregate military from non-military uses of space technology, except at the extremes like nuclear warheads. This was evidenced by the reluctance of the United Nations Ad Hoc Committee on Peaceful Uses of Outer Space to reach detailed conclusions on the meaning of "peaceful uses" in advance of the discussion and resolution of related issues in disarmament negotiations.

To find a realistic, effective method of insuring that space is used exclusively for peace continues to be a prime and urgent goal of the United States. This might be called the prohibitory, or negative, side of space law. It means that a way has to be found to some form of international agreement or understanding, effectively promoting general stability of expectation that outer space will not be used in ways to threaten the peace. The United States government has continued to work toward that goal within the framework of the United Nations, through international agreements and through positive unilateral action aimed at insuring that outer space will be used only for non-aggressive purposes. Although on the international side there is a little progress as yet from which we can take encouragement, the goal remains important and should, by every reasonable means, be pursued.<sup>21/</sup>

The positive part of space law is no less important. The United States has taken the view that the family of nations should encourage all activities in outer space with the exception of those whose prohibition shall have been or should be internationally agreed upon. This is sound. The uses of outer space that have been made and are presently contemplated are, in the main, uses in which it is possible for several participants to engage without serious mutual interference. Space holds great promise not only for scientific information, but also for important benefits in communications, transportation, meteorological information, and other inclusive or sharable uses. While particular activities may require regulation--for example, an agreed allocation of radio frequencies--there is no sound reason for the community of nations to tolerate general claims to exclusive uses of any part of this vast, sharable resource.<sup>22/</sup>

A second positive side is the fostering of international collaboration on space activities. On December 12, 1958, by Resolution 1348 (XIII), the United Nations General Assembly created an Ad Hoc Committee to examine peaceful uses of outer space and to report to the General Assembly at its next session. The terms of reference laid down in Paragraph 1 of the Resolution were:

- "a. The activities and resources of the United Nations, of its specialized agencies and of other international bodies relating to the peaceful uses of outer space;
- "b. The area of international cooperation and programs in the peaceful uses of outer space which could appropriately be undertaken under United Nations auspices to the benefit of States irrespective of the state of their economic or scientific develop-

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<sup>21/</sup> See 25, 87, 441, 451.

<sup>22/</sup> See generally 678-79.

ment, taking into account the following proposals, among others:

- (i) Continuation on a permanent basis of the outer space research now being carried on within the framework of the International Geophysical Year;
  - (ii) Organization of mutual exchange and dissemination of information on outer space research; and
  - (iii) Coordination of national research programs for the study of outer space, and the rendering of all possible assistance and help towards their realization;
- "c. The future organizational arrangements to facilitate international cooperation in this field within the framework of the United Nations;
- "d. The nature of legal problems which may arise in the carrying out of programs to explore outer space."

The Resolution proceeded from the premise that international encouragement of space activity can stimulate scientific progress and its application to economically and socially beneficial ends. It can foster the collaboration of scientific and technical workers of many lands--not only the citizens of States now capable of launching objects into outer space, but men of skill and talent throughout the world. It can stimulate international cooperation in the arts of peace.

The Soviet Union, Czechoslovakia, and Poland refused to take part in the deliberations of the Ad Hoc Committee; the United Arab Republic and India took the view that that refusal precluded the Committee from accomplishing any useful function. The Soviet refusal was expressly based upon the "inequality" of representation on the Committee. As if declaring outer space to be within bounds of a Cold-War game, Soviet spokesmen stated that the Committee should have equal representation from the NATO and Warsaw Pact countries.

The Committee met, nonetheless, in May, June, and July, 1959, with thirteen countries represented. It completed a report (Document A/4141, July 14, 1959), to which representatives of all participating countries unanimously adhered.<sup>23/</sup> With due allowance for the exigencies of international compromise, the U.N. report was a useful first step towards the basic goal of building a sensible legal framework for activities in space. This report was presented to the U. N. General Assembly; in the meantime a new committee with larger national membership was named in December, 1959. It remains to be seen what action this new committee will take, including any action on the report of the Ad Hoc Committee.

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<sup>23/</sup> See source No. 247.

A further fact to be taken into account by both governments and scholars is the strong support from the international scientific community for the broadest possible exchange of scientific data and information derived from space.<sup>24/</sup> It would be a fair statement that two most interested professional groups, the military and the scientific, are in agreement that activities in space should not be hampered by the imposition of a legal system which, for example, would require prior consent of all subjacent states for all activities. Scientists and the military may disagree on the type of information to be disseminated, on techniques of control, and on particular activities that should be fostered or prohibited; but they are united in opposition to a legal regime that would regard space as subject to national sovereignties. It is not, therefore, surprising to find that scholars in all countries have been overwhelmingly in support of the proposition that at some point, defined in terms of location or of function, national sovereignty ceases and something else begins.<sup>25/</sup> The U.N. Committee took substantially the same position, with qualifications to be discussed later.

Related to both the negative and positive aspects of space law are the facts that no nation has as yet requested permission from another to fly satellites and space vehicles at very high altitudes "over" the other's territory, and that no nation has as yet protested such overflight as a violation of its sovereignty. Earlier writers had to regard this fact as one for future speculation, noting, for example, Soviet protests at the overflight of United States high-altitude balloons as potentially indicating a certain Soviet view of space activities.<sup>26/</sup> To these might be added the protests at the U-2 overflights. Yet no protests were lodged against two satellite launchings that took place at almost the same time as the downing of the U-2: TIROS, a photographic satellite widely supposed to be among other things the forerunner of a reconnaissance satellite, and an early form of MIDAS, a device designed to "sense" the flashes of heat from missile launchings below. Although the evidentiary value of the absence of protest is itself not free from dispute, the present political and factual context would seem to lend an exceptional importance to the absence of protest in this case.

It has been observed that the views of lawyers have been, as they ought to be, influenced by increasing knowledge about space activities and their significance for communication, meteorology, navigation, observation and other uses.<sup>27/</sup> Two examples will suffice to make this introductory point. The first has to do with technical aspects of regulation. The range and "bite" of any system of international control of space activities must depend in substantial measure on the technical possibilities of verifying compliance and detecting evasion. To say this is not to deny that the very existence of an agreement may, to an (uncertain and varying) extent, inhibit violation even if the violation be considered undetectable; it is only to point out that one must expect different things from a system of registration, reporting, or inspection depending on the technical means at hand.

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<sup>24/</sup> See generally 88-94.

<sup>25/</sup> See especially subsections 2a, 2c, and 3, below.

<sup>26/</sup> 521, 531.

<sup>27/</sup> 1, 2, 19, 385-88, 658.

For the second illustration we may advert again to the protested aerial reconnaissance by the U-2. Assuming, as seems reasonable, that similar reconnaissance is or becomes technically feasible from satellites, would the differences in altitude and in vehicles make the activity politically and legally acceptable to states whose territory is observed?<sup>28/</sup> If not, what consequences may or should follow? Can such problems be resolved in terms of the location of the observer, or must they be solved in terms of the nature of the activity? Unfortunately, as this study indicates, problems of this sort are ubiquitous. One cannot avoid the conclusion that, at some time and in some manner, a law of space will have to come to grips with some method of determining and defining what activities in space, if any, are to be discouraged or prohibited.<sup>29/</sup> To the extent that facts bear out the desirability of such classification and classification itself is possible technically, then it may be that problems of the general legal status of space are--even "legally"--less important than problems cast in terms of the particular activity under consideration.

## 2. Problems of Sovereignty

### a. Sovereignty over Air Space

Most of the writing on space law regards as the central problem of the subject the determination of the legal status of space; that is, how far "up" or "out" does national sovereignty extend, and what is the status of space beyond these limits if such limits exist?<sup>30/</sup>

The starting point of all these discussions is the existing law on sovereignty in "air space". Under the terms of international conventions and most national legislation, national states have complete and exclusive sovereignty in the "air space" above their territories.<sup>31/</sup> No writer, whatever his views *de lege ferenda*, has questioned that all states make this claim on their own behalf and acknowledge it when claimed by others.<sup>32/</sup> No government official has suggested any general lack of agreement as to the existence of sovereignty over air space.

Whether existing international agreements and customary law with regard to air space apply of their own force to activities in (outer) space has, therefore, been exhaustively discussed by publicists. Essentially the same question can be put in a number of ways: How far out does "air space" extend? Does "air space" include all space "above" national territory? Is there legally a distinction between "air space" and "space" (or "outer space", "cosmic space", and various other names for what, if anything, lies beyond)?

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<sup>28/</sup> 497-500, 624.

<sup>29/</sup> See generally 128-36.

<sup>30/</sup> See 540-643.

<sup>31/</sup> See generally 270-312.

<sup>32/</sup> 504, 506, 508-9, 519, 521, 524; but *cf.* 507.

For the great majority of writers who have concluded that "air space" (and "therefore" sovereignty) does not extend indefinitely, two further problems are necessarily raised: Where does "air space" cease? What is the status of space which lies beyond?

From the terms and history of the relevant international agreements which provide that every state "has complete and exclusive sovereignty over the air space above its territory" arguments of interpretation have been put forward by most writers. Identical language is used in the Paris Convention of 1919 and the superseding Chicago Convention of 1944. In each case the phraseology is in terms of "air", "air space" or foreign equivalents literally translated as "atmosphere" and "atmospheric space". Furthermore, the agreements deal with, and refer to, "aircraft", "air navigation" and equivalents, and, in annexes to both the Paris and Chicago Conventions, "aircraft" are defined as machines which can derive support in the atmosphere from reactions of the air. There is general agreement among the writers that the draftsmen of the pertinent sections of the Paris and Chicago Conventions had no thought, at the time, of space vehicles and space travel.<sup>33/</sup> All craft, with the exception of the V-2 rocket which in 1944 was in some use, required aerodynamic lift.

While no writer has as yet examined definitively all national statutes regulating flight, those that have been cited employ jurisdictional language closely parallel to that of international conventions. Even if some did not, it would be difficult to infer from the language of such unilateral claims an international acquiescence in a greater vertical sovereignty than that provided for in the multilateral conventions--whatever that may be.

From the use of words such as "air", "atmosphere" and "aircraft", most writers have concluded that the conventions do not apply automatically to activities in space, although the "boundary" (discussed below) between "air space" and "space" is as yet undetermined; that is, although the area in which the agreements do operate is not clearly defined and distinguished from that in which they either do not or may not.<sup>34/</sup>

The fact that the ambit of existing conventions acknowledging the sovereignty of subjacent states over air space is overwhelmingly regarded as a limited one leaves the status of space an open question. One cannot on this evidence alone infer an abnegation of sovereignty over space beyond air space. One can say that it is doubtful that states have already agreed to the extension of national sovereignty to higher altitudes.

Commentators have persuasively supported this interpretation by pointing to other evidence to rebut claims to sovereignty at very high altitudes. Most significant in this connection is the fact, already mentioned, that states signatory to the conventions, as well as nonsignatory states whose legislation claims sovereignty over air space, have not as yet protested any launching of objects at high altitudes as violative of their sovereignty.<sup>35/</sup> The orbit of one

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<sup>33/</sup> 270, 280, 282-85, 288, 292, 296, 309, 311.

<sup>34/</sup> 272, 276, 278, 380-81, 291-94, 311.

<sup>35/</sup> 113-16, 659, 670, 687, 718, 724.

or another of these objects has at some time taken it to a point in space that is directly above the territory of almost every other state on the earth, in the sense that the object would have been "hit" by the projection of a radial line drawn from the center of the earth through some point on the surface of that state's land mass (or territorial waters). If states regarded those objects as passing through an area subject to their sovereignty, one would have expected protest or objection or, at a minimum, public statement reserving their rights and stating the conditions of their acquiescence to present activities. Initially scholars predicted or anticipated such protests. When they failed to materialize after the first successful orbiting of satellites a number of writers pointed out that the acquiescence might have been implicitly limited by the circumstances of the International Geophysical Year, and that in view of this world-wide scientific effort the acquiescence need not be construed as a general consent or waiver.<sup>36/</sup> The pattern of acquiescence has now, however, continued well beyond the IGY and has included a wide variety of objects with varying purposes. This continuing silence seems consistent only with the absence of claims to sovereignty in overlying space at the altitudes at which satellites have orbited and space probes have flown.

This conclusion is bolstered by the attitudes of states participating within the United Nations. In the debates preceding the passage of General Assembly Resolution 1348 (XIII) creating the Ad Hoc Committee on Peaceful Uses of Outer Space, most states took the view that space was distinguishable from air space, and that national sovereignty did not extend indefinitely. The Ad Hoc Committee itself, in its Report and in its public debates, expressed the same opinion, in guarded language. While the Soviet Union did not participate in the Committee, Soviet scholars seem to be in accord on this point,<sup>37/</sup> and, by implication from its space activities, the Soviet government seems to proceed from a similar position. In the debates that took place in the Security Council in May, 1960, on the Soviet charges of aggression in the U-2 overflights, several speakers (not from the Soviet bloc) did allude to outer-space activities; but they seemed not so much to be pushing airspace concepts upward as to be pulling outer-space concepts downward.

A number of writers have pointed also to practical arguments in support of the contention that national sovereignty does not extend indefinitely. It has been pointed out that the moon and other bodies in space pass directly "over" the territory of various states, but no states have ever claimed that they have sovereignty over them.<sup>38/</sup> Nor, it is urged, could they do so in view of the fact that other states would have as good a claim. Since the notion of bodies in space being at one moment subject to one state's sovereignty and at another moment subject to another state's sovereignty seems incompatible with the idea of comprehensive sovereignty, it has been urged that sovereignty in space must in any case stop short of the moon.

In addition, many scholars have observed that claims to sovereignty over air space historically bore a close relationship to national security and

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<sup>36/</sup> 117-21, 123-25, 127.

<sup>37/</sup> Cf. 540, 568, 651; see sources 73, 74, 145, 214, 271.

<sup>38/</sup> 237, 239, 241.

defense.<sup>39/</sup> Subsequently regulation by the subjacent state also was conceived to be important in terms of transportation, commerce and safety.<sup>40/</sup> Yet, beyond some limit (which is never a precisely definable limit and which varies with particular factors), the fact that an object is located, or an activity is taking place, "above" a certain spot on the surface of the earth has no necessarily close or intimate objective connection with that spot. Some activities in space require line-of-sight connection with a given area on the earth but do not require that the particular line of sight remain within the projected vertical boundaries enclosing that area. Even from the point of view of defense against missiles, if something is dropped or pushed from space to fall on a given area on the earth it is not a necessary incident that the descent be commenced at a point directly "above" that area, and in the majority of cases it would not be so. Similarly, countermeasures designed to protect a given area on the earth from attack that issues from, or passes through, space may for physical reasons have to make contact at some point in space that is not "above" the defended territory. Indeed, the energy cost of arranging for a path "straight up" or "straight down" between an object in outer space and a point on earth would probably be prohibitive under present technology for payloads of considerable weight.

This latter argument points to the lack of utility in extending sovereignty to very high altitudes from the point of view of subjacent states potentially "affected" by an activity.<sup>41/</sup> The traditional feature of claims to sovereignty, as distinguished from lesser jurisdictional claims, is simply the legal capacity to forbid virtually any activity within the area claimed unless consent to such activity is expressly given or can be implied from past conduct. It is for this reason that one would have expected protest had any states regarded existing satellites as having violated their air space. Since satellites and space probes pass through space which is "over" several states, a claim to sovereignty at very high altitudes would, in effect, be a claim to a veto power over any space activity whatsoever of which any subjacent state disapproved. There would be no need to assert an "interest" or any adverse effect; the disapproval could be entirely arbitrary.

Such a regime would be undesirable and for political reasons unlikely. In view of the military potential of space, it is highly unlikely that major space powers would acquiesce in a rule which--given the character of orbital trajectories--permitted a veto by another state of activities that they regarded as essential to their national security and defense.

This is not to suggest that minor powers have no interest in curtailing claims to high altitude sovereignty. All people everywhere have an interest in the benefits that space activities can bring to all. The benefits that mankind can gain from space activities, both for scientific knowledge and for a variety of other socially useful and desirable purposes, would be endangered by a rule which permitted a few states, acting arbitrarily, to hold up space progress. Furthermore, states presently having space capabilities are endowed with sufficient territory and adjacent high seas to launch missiles without violating the traditionally understood territorial air space of other states.

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<sup>39/</sup> E.g., 619.

<sup>40/</sup> 507, 508, 518, 521, 698.

<sup>41/</sup> Cf. 534, 536.

States with smaller territories hemmed in by other sovereignties will be less fortunate in their capacity to launch missiles or bring them back to earth without a technical violation of some other state's sovereignty, if a "boundary" is conceded to exist below which space craft are held to be trespassers on air space. The higher the "boundary," the more difficult the situation potentially will be for such states. Nor is the situation hypothetical, for it is probable that many states will have space capabilities in the future. The present high costs of rocketry lie in experiment and development. Once these costs have been absorbed, the rocket production and launching will not be so dear as to preclude many users.

Not all writers have been persuaded by these arguments; at least one believes that national sovereignty extends outward without limit.<sup>42/</sup> But the overwhelming majority of commentators take the view that at some point national sovereignty ceases, and this view appears to have the support of governments.<sup>43/</sup>

Three final points should be borne in mind: (1) To say that existing conventions do not of their own force apply in space is not to say that their provisions may not be relevant in many respects to space activities;<sup>44/</sup> (2) writers who agree that sovereignty does not extend indefinitely do not agree on where it ceases to exist; (3) general agreement that space beyond the "boundary" is not subject to the sovereignty of the subjacent state does not of itself establish the legal status of space, the terms and conditions on which states can use such space, or the rights and duties of states with respect to one another with regard to activities in space.

#### b. The Boundary Between Air Space and Space

As we have seen, there is formal agreement that air space is subject to national sovereignty and substantial agreement that what lies in outer space is subject to a different legal regime or regimes. It has seemed to most observers to follow as a matter of inexorable logic that at some altitude sovereignty ceases. A great deal of the writing on space law has been concerned with discovering or proposing the location of this "boundary", and prescribing the upper limits of national sovereignty.<sup>45/</sup>

Before examining the various proposals that have been advanced, we may note that the logical existence of such a boundary would not, without further argument, establish the importance of explicit or implicit agreement as to where it is. Though many commentators regard this problem as the most important problem of space law presently facing lawyers and governments,<sup>46/</sup> others regard it as having a low priority and little practical importance.<sup>47/</sup> These conflicting positions will be discussed after we have examined proposals on the location of the boundary.

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<sup>42/</sup> Cf. 700

<sup>43/</sup> E.g., 663-88.

<sup>44/</sup> Indeed, some writers have suggested that the Chicago Convention be amended to allow its application to space instrumentalities. 299-301; cf. 303.

<sup>45/</sup> E.g., 540-643.

<sup>46/</sup> E.g., 612.

<sup>47/</sup> E.g., 159, 162, 192.



It is not always easy to distinguish between boundary suggestions put forward as if reflecting an interpretation of existing conventional law and proposals recommended for future agreement. Since conflicting interpretations of existing law would require some form of agreement for their resolution, it may make relatively little difference whether a writer is talking de lege lata or ferenda. Many proposals have been based upon supposed geophysical or astronomical constants;<sup>48/</sup> some on beliefs as to the maximum height attainable by aircraft;<sup>49/</sup> some on more than one boundary, or zone, or belt.<sup>50/</sup> Many proposals have been withdrawn by writers initially proposing them.<sup>51/</sup>

The most frequent approach has been to relate the proposals in some way to the existing conventions. As we noted, these conventions refer to "air" or "atmosphere" and deal with "aircraft" as defined in annexes. National laws also use terms identical with or similar to those included in the Paris and Chicago Conventions. It can be and has been argued, therefore, that under these conventions and laws the use of the terms "air," "air space," "atmosphere," or "atmospheric space," or the expressed purpose of regulating "aircraft," affords a criterion for measuring sovereignty.<sup>52/</sup>

One proposal, relating "air" to "aircraft," suggests that claims to sovereignty acknowledged in existing conventions and custom go only to the height to which "aircraft," as defined in the annex to the Chicago Convention, can ascend in the atmosphere while "deriving support from reactions of the air."<sup>53/</sup> From this perfectly legitimate interpretation would follow certain difficulties, acknowledged even by its proponents.<sup>54/</sup> First, it does not provide a fixed location of the "boundary" in very precise terms. Second, if offered as a proposal for the future it is thwarted by the likely activity of "aircraft" such as the X-15, which use aerodynamic lift at lower altitudes but can with the aid of other devices be flown out of the lift area .

A variation of this proposal is the "von Karman line". As put forward by Haley and others, it accepts the basic concept of aerodynamic lift but argues that such lift need not be the only "support" and that present law could be interpreted as extending sovereignty up to the point where any aerodynamic lift is available. For an object traveling at 25,000 feet per second, that line is said to be about 275,000 feet from the earth's surface.<sup>55/</sup> While this line is thought to have more stability than the proposal first put forward, it would also vary with atmospheric conditions and with design changes and other factors affecting the flight of objects.<sup>56/</sup>

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<sup>48/</sup> E.g., 582, 584, 636.

<sup>49/</sup> E.g., 549-51.

<sup>50/</sup> E.g., 555-56, 559-60.

<sup>51/</sup> E.g., Professor Cooper's "effective control" theory, advanced in 1951 and later withdrawn.

<sup>52/</sup> E.g., 272-73, 276-78, 280-81.

<sup>53/</sup> 272-73, 277, 280-81, 549-552.

<sup>54/</sup> E.g., 553, 643.

<sup>55/</sup> 635-42.

<sup>56/</sup> 643.

A third approach, similar but distinguishable, lays stress upon the word "air" or "atmosphere," rather than "aircraft," and seeks to use a scientific definition of the earth's atmosphere to determine the reach of sovereignty.<sup>57/</sup> That interpretation, again a perfectly permissible one, runs into rather more difficulties than the first two suggestions.<sup>58/</sup> First, there is no agreed definition among scientists any more than lawyers of the word "atmosphere," whose meaning varies with conditions as well as the purpose of the inquiry. Second, several of the possible definitions would certainly put the limit far above many satellite orbits and missile flight paths, though it may be doubted whether the proponents intended to claim that the satellite flights had trespassed upon national air space. In short, it would be too high and too uncertain.

A number of other proposals, suggesting more or less arbitrary lines based on variations of the reasoning described above, have been put forward. These suggest agreement either interpreting the conventions or fixing the boundary afresh at an altitude roughly related to lift, or drag, or atmosphere.<sup>59/</sup>

A somewhat different approach, which takes advantage primarily of the inferred attitudes of states to satellites already orbited but still is capable of doctrinal harmony with existing law, is to set the boundary at that altitude at which unpowered flight is possible; or, with somewhat more precision, at which an unpowered satellite will orbit the earth at least once. This proposal would bestow express legality on previously launched satellites, and it can also be related to many of the definitions of aerodynamic lift and atmosphere. It has the difficulty (among others) that we are not presently certain that a reasonably exact distance for all parts of the earth's surface, all relevant velocities and altitudes, and all possible orbits can be calculated.

Variations of these formulas which take account of some of the uncertainties in expressing an exact boundary are those that add to the area of sovereignty a further contiguous zone, supposedly analogous to that of the high seas, in which subjacent states may exercise jurisdiction but over which they do not have sovereignty.<sup>60/</sup> Similar suggestions had played a role briefly in the early debates on air space sovereignty, during the early years of the century.<sup>61/</sup> While Cooper's proposal to this effect for outer space was initially approved by others, he has not recently urged its acceptance, and the more recent literature generally ignores it.<sup>62/</sup>

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<sup>57/</sup> 540-43, 546-48. See also source 272, pp. 111-21.

<sup>58/</sup> Cf. 599, 605.

<sup>59/</sup> E.g., 540, 549-50.

<sup>60/</sup> 555-60.

<sup>61/</sup> See source 272 at 19-20; source 152.

<sup>62/</sup> 561-63.

A different theory of sovereignty over air space, not related to the words of existing conventions but capable of being related to their purposes, is that which Kelsen proposed in 1944 in connection with the Paris Convention. He viewed the claim to sovereignty, recognized by that Convention, as going as far out as the subjacent state could exercise effective control. He recognized that under this theory there would be not one single boundary but several boundaries, since some states were more technically proficient than others, and that the boundary would keep going up as science added new techniques for controlling space activities.<sup>63/</sup> For these reasons the proposal seems unlikely to be acceptable to many states. A variation suggested by Cooper in 1951 (and later withdrawn) called for the extension of state territory "as far as then scientific progress of any state in the international community permits such state to control space above it."<sup>64/</sup> This would have eliminated the diversity of boundaries existing at any one time but not the difficulty of determining the uniform boundary or the instability of that boundary once determined.<sup>65/</sup>

Still another proposal is that which argues that a state's sovereignty extends as far as its interest extends.<sup>66/</sup> In its acknowledgement of a basic purpose behind claims to sovereignty, this view is sound. But it is difficult to define a state's interest, and its interest in some activities would extend to a very high altitude and to others much less. Some activities in which a state was vitally interested would be outside its air space thus defined because the line-of-sight connection would not require a space object to be "overhead"; at the same time a state could use its claim to sovereignty to exclude activities in which it had no legitimate interest whatsoever and which bore no special relationship to its territory.

Finally, proposals have been made for several lines rather than one. We already noted the existence of proposals for a contiguous zone. Knauth, for example, goes much further. Instead of endeavoring simply to distinguish air space from outer space, he proposes several "belts": "airspace," "air-non-air fringe," "orbit-satellite," rocket failure area, "belt in which the Moon orbits." He believes that each belt should be subject to its own legal regime, and that all belts in cis-lunar space should be presently given legal status appropriate to each.<sup>67/</sup>

A rough and incomplete tabulation of altitude-boundaries inferred, reported, suggested, or proposed by several of the writers on space law may serve to illustrate the controversy. In generally "ascending" order, they are as follows:

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<sup>63/</sup> For a similar view of the Chicago Convention, compare 274.

<sup>64/</sup> Source 51; see abstracts 566-69, 571. The relevance of effective control to an eventual resolution of the boundary problem has been underlined in source 146, pp. 138-39, 148

<sup>65/</sup> 565, 572-79.

<sup>66/</sup> Cf. 615-16, 623, 626-27.

<sup>67/</sup> See ABA Sec. Int'l & Comp. L. 1959 Proceedings 232-33 (1960).

<u>Height</u>	<u>Abstract # or Source</u>	<u>Remarks or Reasons Given</u>
30 miles	616	400 miles for neutrals in wartime.
275,000 feet	636	Objects traveling at 35,000/sec.
52 miles	594	Limit of atmospheric lift.
53 miles	643	Von Karman line.
60 miles	584	Loss of earth's gravitational effect; air travel becomes impossible.
100 miles	606	
200-300 km.	Source 272	Limit of air-filled space.
150-225 miles	609	
300 km.	599	Limit of area filled with air layers.
250 miles	Neumann <sup>68/</sup>	Too little air.
200-300 miles	626	Analogy to 3-mile limit at sea.
300 miles	555, 559	Limit of "contiguous space".
300-500 miles	Source 35	Assumptions as to atmosphere.
310-620 miles	605	Limit of atmosphere.
500 miles	603	
650 miles	Source 62	Limit of atmosphere.
7000 miles	Source 74	Citing Western meteorologists.
Infinity	700; Source 115	

From what has been said it is clear that the difficulties of fixing a stationary boundary by reference to supposed geophysical or astronomical constants are at least formidable, perhaps insuperable. Many proposals have been withdrawn or varied in the light of new scientific information. Whether the physical characteristics of the air, the physical characteristics of flight craft, or other relevant factors can be reasonably expressed with reference to a fixed altitude is a subject of dispute. The measurement of that fixed altitude may be a source of scientific disagreement. If, to avoid these difficulties, an arbitrary limit were to be chosen, it might be difficult to get agreement on a height that was not related either to the purpose of space activities or the language of existing conventions.

Yet disagreement stemming from such difficulties may be exaggerated. Let us examine the area of agreement.

First, it seems clear that the sovereignty over air space acknowledged by the various air conventions and customary law extends at least as far as is required by and for the purposes that those conventions envisage; that is, to the altitude presently used for normal aircraft flight, and so much more of the air space as might reasonably be envisaged as usable for similar purposes. Since the conventions speak of "air space" rather than the objectives of commercial aviation, one cannot delimit a boundary by referring to any existing usage or altitudes achieved at any given time;

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<sup>68/</sup> Neumann, The Legal Status of Outer Space and the Soviet Union, Air Intelligence Information Report, IR-1184-57 (February 18, 1957).

"air space" may be the area used for "aircraft"--as several scholars have suggested--but that area does not seem more easily defined by this suggestion, nor is it the only permissible interpretation of the conventions or customary law. In any event, we should have no difficulty in concluding that "the" boundary, if it existed, would be somewhere above the altitude now in common use for aviation purposes. The recent U-2 flights, at altitudes of some 12 miles or more, were not formally defended as being beyond traditional "air space" and weather balloons at altitudes of over 100,000 feet have been protested.<sup>69/</sup>

On the other hand, the failure of any state to protest as an invasion of its sovereignty any space activities to date strongly supports contentions that "the" boundary of sovereignty, if one were to be fixed, should not be placed at higher than, roughly, the probable perigee of durable satellite orbits. This view would be consistent with several of the proposals made by scholars seeking to interpret the existing conventions; aerodynamic lift, von Karman line and some other definitions of atmosphere as related to flight could be brought into approximate harmony with it. Earlier proposals which took atmosphere (in the legal sense) much further into space seem inconsistent with practice since 1957. Arguably, too, a ceiling on national sovereignty at some such point would be consistent with present contentions about effective control (though not with future possibilities). Beyond some such altitude, also, most activity is less and less related to any special interest of an "underlying" state. Furthermore, the fact that sovereignty over air space did not extend beyond such an altitude would not mean that states with space capabilities could lawfully do anything they wished "above" this line, or that "underlying" states did not possess some rights with regard to particular activities, analogous to those that coastal states possess beyond territorial waters, based not on sovereignty but on a legitimate interest with regard to the particular activity.

We might provisionally conclude, therefore, with wide support from scholars and from governmental actions, that "the" boundary lay somewhere between these two possibilities: higher than traditional flight (say, twelve miles) and lower than the perigee of past satellites (say a hundred miles). The gap between a twelve-mile floor and a hundred-mile ceiling might seem to leave room enough for the placing of an arbitrary line or even a zone; yet there are grounds to believe that the gap is unstable and may become meaningless. For one thing, experiments such as the X-15 indicate that it is possible to have a craft that is both an "aircraft" and a "spacecraft". Therefore, the limit of conventional air space in terms of usage or purpose at least potentially may be moving up to, and even above, areas now regarded as beyond national sovereignty.<sup>70/</sup> There is somewhat similar evidence that typical "space" uses may move downward toward present conventional air space. For example, power-assisted satellites may come to move continuously at an altitude lower than that in which free flight is now possible, and such satellites may be even more advantageous for some uses than satellites restricted to higher altitudes.

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<sup>69/</sup> See 529-31; Radio Moscow, Soviet Home Service, October 11, 1958, quoted in FBIS Report, "USSR International Affairs," October 13, 1958; New York Times, October 12, 1958.

<sup>70/</sup> See 553, 643.

Thus, it seems probable that our provisionally assumed minimum altitude and maximum altitude may be in the process of converging and also possible that they may even cross each other; that is, some typical air activities may at some future time be conducted at altitudes higher than some typical space activities.

It is not an answer to this observation to point out that the extremes may be clear despite fuzziness at the border-line. The present inquiry is not whether the extremes should be treated differently, but whether a border-line should be drawn. With present knowledge of space activities and technology in a relatively infant and rapidly developing state, it is important to examine arguments for and against drawing a "boundary" in precise terms at this time. Is it important? Is it possible? Is it likely to serve any useful purpose?

At the outset it should be noted that while many writers have urged that agreement on the boundary be achieved at the earliest moment possible some of these same writers have recently urged caution and do not seem to attach the same urgency to its resolution. This change of position is not necessarily a change of viewpoint, but may simply reflect new environmental and political factors. Initially it was feared that, without agreement, space activities would be hampered by contentions that sovereignty was being violated.<sup>71/</sup> The failure of these protests to develop, and the gradual growth of a customary law which appears to limit claims to sovereignty to relatively low altitudes, are important new developments, which may remove much of the force that once was thought to underlie the argument for a formal boundary agreement.<sup>72/</sup>

The strongest arguments for determining with precision the boundary between air space and space seem to be these: (1) That formal agreement would help to preclude states from making unjustified claims in the future to sovereignty in large regions of space "above" their territory on the contention that it is "air space".<sup>73/</sup> Some legitimate verbal formulas (for example, definitions of "air" or "atmosphere") would go to one thousand or more miles. Efforts of some of the most distinguished scholars, wary of our past difficulties in coping with similar claims with regard to the high seas, unoccupied territory and the like, have undoubtedly been directed at this objective. (2) That given certain possible interpretations of existing conventions, there is always the possibility that some states will protest space activities as violative of their sovereignty.<sup>74/</sup> Acceptance of such contentions would greatly hamper space activities favored by scientists and military specialists alike, and would permit relatively small states to exercise what could amount to an arbitrary veto over particular activities. (3) That disputes as to the extent of air space could lead to international tensions and serious controversy.<sup>75/</sup> (4) That the United States, supporting as it does the Rule of Law in international as in domestic

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<sup>71/</sup> E.g., 532-33, 610.

<sup>72/</sup> Cf. 128-53, 178-95.

<sup>73/</sup> Cf. 274, 297, 304-8.

<sup>74/</sup> 610.

<sup>75/</sup> See 148, 151.

matters, should avoid being put in the position of making unilateral decisions on the interpretation of existing conventions and should urge resolution through international agreement and other cooperative means.<sup>76/</sup> (5) That the resolution of this fundamental legal question would help to induce cooperative attitudes toward building law in regard to space and that these attitudes could help to shape desirable technological trends.<sup>77/</sup>

Arguments against efforts to resolve the boundary problem by fixing on an agreed altitude can be summed up as follows: (1) That the absence of explicit agreement has not yet led to international tensions and does not appear likely to do so. That an attempt to reach explicit agreement on establishment of an altitude boundary would invite many states to make claims to sovereignty which, in analogous cases such as the high seas, have led to immoderate demands. Pandora's box might be harder to close than to open. (3) That any boundary set might have to be set too high. An altitude beyond that which seems to be the maximum being established by custom (the roughly one hundred mile figure suggested above) would seriously hamper some space activity. A figure of a hundred miles, while less serious in effect, might also hamper at least some future activities. The possibility of getting anything less through agreement would seem to be negligible, primarily because fear of the unknown would lead states to claim as much as they could. On the other hand, future activities at lower altitudes may be acceptable if there is no explicit agreement on the extent of air space. (4) That an agreed altitude once achieved will be next to impossible to reduce. States will not gladly give up sovereignty over territory. (5) That an agreement reached later is likely to fix on a lower altitude than an agreement reached sooner, and that the lower figure would be in the general interest. (6) That an arbitrary line, even if low enough to permit more space activity, might encourage rather than avert disputes because it might provoke technical complaints about violations which at high altitudes would be difficult to verify.

This last point perhaps requires elaboration. It rests on the premise that the boundary question is inextricably tied to the question, What activities are permissible beyond it; that is, What rules govern space? The claim to sovereignty amounts to a statement that within the specified area only activities permitted by the subjacent state may be carried on, and assumes some intimate connection between that area and the state.<sup>78/</sup> The converse is not, of course, true. Beyond the boundary not every activity is legally permissible; but at the moment it is very difficult to specify what activities are permitted and what are not. Drawing the boundary will not help to solve this problem except perhaps to the limited extent of shifting the burden of proof. It has already been pointed out that the higher the altitude of an activity, the less the space "above" national territory bears any special relationship to the underlying area, whether for reasons of defense, transportation, commerce or safety.<sup>79/</sup>

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<sup>76/</sup> Cf. 134, 135, 140.

<sup>77/</sup> See generally 128-52.

<sup>78/</sup> For suggestions as to what this connection might be, see generally 614-32.

<sup>79/</sup> 694-98.

Two examples may illustrate. First, artificial satellites launched in geocentric orbits have come much closer to the earth at some points than at others, although in no case interfering with any obvious interests of any subjacent state. In some cases the perigee fell within one or more of the boundaries proposed by publicists, while the apogee fell beyond. It would make little sense to impose one legal regime or status on a satellite at perigee and another on the same satellite at apogee, at least under present technology.<sup>80/</sup> This is, of course, an argument only against establishing the line "too high," not against an arbitrary line that would be "low enough"; but, as indicated above, doubts have been raised whether under present conditions of the international political process a boundary could be set "low enough."

Second, in the U-2 incident the Soviet Union charged the United States with "aggression" and accused it of "espionage." It has been frequently stated in the West that the U-2 was violating Soviet air space and that for this reason the Soviet Union could legitimately object to the unpermitted overflight. This would not amount to "aggression." But was the Soviet objection based primarily on the location of the U-2 or on the character of its activity? In the near future satellites may be able to perform equivalent functions from altitudes of (say) two to three hundred miles. Would a boundary set at a hundred miles remove Soviet objections to such activity? True, it would forestall objections based on violation of air space. But it would not of itself establish the legality of the activity if there were other grounds to consider it illegal.<sup>81/</sup>

The Committee on Foreign Relations of the United States Senate, reporting on "Events Relating to the Summit Conference, June 25, 1960," has connected the U-2 incident and the boundary question in the following language:

Finally, the U-2 incident has pointed up the need for international agreement on the question of how high sovereignty extends skyward. This question is certain to become more acute in the future as air craft fly at higher altitudes and as space flights, many of them equipped with cameras or other devices, become more common. It is a question full of difficulties and one which demands the full attention and consideration of the United Nations as well as the individual nations themselves. The Committee hopes that efforts will be pushed to pursue U.N. studies with a view to bringing about agreement.

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<sup>80/</sup> But cf. 589.

<sup>81/</sup> Compare 500.



The foregoing part of this analysis, however, would indicate rather that the U-2 incident underlined the extreme difficulty of an attempt to agree on the permissibility or impermissibility of space activities by reference to an altitude boundary, and lends support to the action of the United Nations Ad Hoc Committee, which at its meeting in 1959, classified the boundary problem among those not susceptible of priority treatment.<sup>82/</sup> It did this in part because other members doubted the wisdom of drawing a fixed boundary, in part because other members had doubts as to its feasibility at that time. The Committee also suggested the possibility of using functional rather than spatial criteria to regulate and control activities in space. Were it possible to build up, through understanding, custom and agreement, adequate functional criteria for space activities then the boundary problem would be obviated. Certain activities might be prohibited; others might be permitted under certain restrictions as to time, place, mode and disclosure; all others would remain free. The system establishing these arrangements might be made up of some specific formal agreements and some general understanding, tacit or at least informal, confirmed by practice and doctrine.

c. Sovereignty over Bodies in Space

The entry to outer space raises legal problems with regard to the use and occupation of bodies presently in space, such as the moon and planets, and of the use and occupation of artificial satellites placed in space by one or more states.

Scholars have much discussed whether it is possible for a terrestrial nation-state to acquire sovereignty over all or part of a natural celestial body, and what would be required under existing international law to make such a claim legally valid. Quite understandably, doctrine of terrestrial international law with regard to discovery, contiguity, occupation and annexation of parts of the earth has been applied to this problem.<sup>83/</sup> A frequently employed

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<sup>82/</sup> 162.

<sup>83/</sup> See generally 196-224.

analogy is Antarctica.<sup>84/</sup> This analogy has seemed particularly apt because it poses in contemporary context conflicting claims to sovereignty on one of the few yet unoccupied parts of the earth, and because these claims have not been based on occupation or settlement in any clear-cut sense. At present, and for some years past, conflicting claims to sovereignty over parts of Antarctica by a number of states have not been resolved, and claims to bodies in space, or parts of them, would be unlikely to be acknowledged by other states. Several writers have noted that the analogy between Antarctica and space bodies though apt is scarcely a helpful one save, perhaps, as it indicates the unlikelihood that claims to sovereignty would be widely honored by other states.<sup>85/</sup> If the present military importance of Antarctica is greater, and that of celestial bodies less, than is commonly supposed, the analogical value of the Antarctic agreement seems all the higher.

There is agreement among several commentators that under existing international law "discovery" of space bodies scarcely provides a basis, factually or legally, sufficient to support claims to sovereignty, and that the same is true of various symbolic acts of occupation such as planting flags, photographing terrain, mapping, or exploration.<sup>86/</sup> In themselves it is doubtful if these acts would be sufficient to justify a state that has made claims to sovereignty in excluding others from the bodies involved and preventing other states from carrying out exploration or scientific experiments. At the same time, however, it is noted that acts of this sort are presently the basis for the suspended or frozen claims in Antarctica. As a result the issue is not free from doctrinal doubts.

Extensions of principles of continuity and contiguity via "vectors" which have marked the Antarctic claims of Argentina and other Latin American states have not seemed applicable to space as they have not been widely acknowledged by other states with regard to Antarctica itself. One commentator, however, has expressed the conjecture that only those states "over" which a body passes would have a basis for claiming sovereignty. The moon, for example, passes over the United States but not over Red China, a fact which might exclude the latter's claim in his view.<sup>87/</sup>

A number of writers have expressed the view that it is not possible to acquire sovereignty in space by any means, that space bodies are to be regarded as res communis or res extra commercium, like the high seas, and not res nullius capable of appropriation.<sup>88/</sup> Such writers see space, and everything in space, as a common resource of all states and mankind, open to all on a basis of equality, and incapable of subjection to the control and sovereignty of a singly earthly state. Some have justified this approach by saying that ours is a "terrestrial"

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<sup>84/</sup> See generally Source 137; abstracts 203, 205.

<sup>85/</sup> 223, 364-65.

<sup>86/</sup> 202, 204-5, 215, 221-22; but see 233-34.

<sup>87/</sup> Kanuth, Letter, 45, A.B.A.J. 14, 16 (Jan. 1959).

<sup>88/</sup> 703-26.

system and that the moon, for example, is not "territory" but a "celestial body" and part of a different "world."<sup>89/</sup> Others state the position more in terms of preference, deploring any status that would permit one state to exclude others from parts of space and preferring to regard the whole of space as a sharable resource. Earthly disputes should not, it has been asserted with some wistfulness, be projected into space; sovereignty in space is undesirable.

This latter viewpoint has led to a number of proposals that space be "internationalized," that bodies in space be subjected to United Nations ownership and control, and that exploitation be under United Nations, rather than national, auspices and law.<sup>90/</sup> Understandably this is a view that is dominant among the smaller states which presently do not have space capabilities. At the meetings of the United Nations Ad Hoc Committee a suggestion in the United States working paper as to the potential relevance of analogies from the Antarctic experience was deleted on a Latin American objection. It was said that they could not be relevant because they dealt with bases for sovereignty and no one could legitimately claim sovereignty in space.

There is a good deal of merit in, and support for, a regime with regard to celestial bodies which prohibits recognition of claims to exclusive sovereignty by any state. It would be useful for both public and private groups to work towards formulating standards and procedures that will guarantee access by all to these resources on equitable terms and prevent interference by one state with scientific programs of another. To a large extent the resources of natural bodies in space, like the vast reaches of space itself, represent sharable assets of the whole community. Scientific exploration of the moon or Venus under national auspices of any one country does not require, and should not without cause involve, the prohibition of similar exploration by other countries. We may look to similar ventures elsewhere in space. These should not be precluded by claims made on various grounds to sovereignty over such bodies; nor should their acceptability depend on the recognition of such claims.

The present trend of both private and public views is clearly against the permissibility of claims to sovereignty over natural bodies.<sup>91/</sup> Soviet writers have taken this view, although at the same time suggesting that it was not the view of the United States and that the Soviet Government would, in such a situation, have to protect its own interests.<sup>92/</sup> The American Government has expressed doubts as to whether space bodies are capable of appropriation. The American Bar Association in 1959 passed a resolution "that in the common interest of mankind . . . celestial bodies should not be subject to exclusive appropriation". The U.N. Ad Hoc Committee took the position that present activities would not be

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<sup>89/</sup> Cf. 237, 241.

<sup>90/</sup> 60, 62, 63, 65, 70; cf. 74; see source 137 at 273-82.

<sup>91/</sup> 199, 200-1, 206, 208, 210, 212-22. For generally conflicting ideas as to what the status of the moon should be, compare 229-41.

<sup>92/</sup> Korovin, International Affairs, November 1959; Romashkin, Technical Progress and Law, Soviet State and Law, No. 1, 1960.

a basis for claims to exclusive sovereignty and expressed the belief that problems involved in such claims would not arise until it became feasible to settle on such bodies and exploit their resources.<sup>93/</sup>

Artificial bodies in space raise comparable problems. While generally such bodies seem more analogous to ships on the high seas, or Texas Towers, or lightships, than to natural celestial bodies, problems as to control and exclusion of others nonetheless may arise. Space stations, used to stage further space exploration, raise questions as to co-ordination of activities, control of access by the launching state or by international agencies, access to such satellites by other states or by private groups, and criteria and standards of peaceful possession.<sup>94/</sup> Once again it has been observed that it would be unfortunate if a legal regime premised on sovereignty or exclusive jurisdiction by the launching state were to result in needless interference between two national space programs, such as might occur if, for example, experiments by one nation were to create hazards to personnel using another nation's satellite for admittedly legitimate purposes.<sup>95/</sup> It would, also, be desirable if standards for cooperative use of space station facilities could be worked out by participants, thus avoiding unnecessary duplication and waste. Once again, the presence or absence of sovereignty does not seem, of itself, to provide many answers to important questions which it is not too early to discuss and explore in a preliminary way looking to effective international rules and sanctions.

#### d. Conflict of Laws

Problems of sovereignty are in some respects related to potential problems of conflict of laws. A considerable amount of conflicts doctrine is premised upon the concept that the national law governing events is that of the territory in which some pertinent act takes place. If space was not subject to the sovereignty of any nation, what national law would govern?

Writers have posed such problems in the traditional terms of territorial jurisdiction based on sovereignty, and have then proceeded to run through the almost endless list of conflicts questions to which a territorial connection is relevant.<sup>96/</sup> The fact, however, that the place of a particular act is not subject to the sovereignty of a particular state, or even that it is not ascertainable, does not make the problem insoluble or even particularly difficult. Other principles are available for choice of law.

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<sup>93/</sup> 196.

<sup>94/</sup> See 485-94.

<sup>95/</sup> 484, 490, 492-93.

<sup>96/</sup> 360-61, 263-68.

Problems of national law will, indeed, arise, as will the need to amend various statutory provisions with regard to jurisdiction and venue.<sup>97/</sup> By comparison with other problems of space law, these seem either relatively simple or relatively routine. It might, however, be unfortunate if the meaning of terms such as "air space," having special diplomatic and political ramifications, were left to judicial resolution in conflict-of-laws cases in connection with relevant national laws. A more delicate and comprehensive treatment of the conflicts question might require, and be secured by, international agreement.

### 3. The Legal Status of Space

#### a. General Observations

If it is assumed that national sovereignty does not prevail in outer space, what is the status of space? To what rules, if any, is it subject, and by whom are they prescribed? A rejection of the contention that subjacent states have sovereignty does not compel us to discern a legal vacuum.<sup>98/</sup> For example, as has been observed, there may in some instances be a special and intimate relationship between a particular space activity and a particular subjacent state. Similarly, general principles of law governing the relations of states, such as those contained in the United Nations Charter, would seem to be as relevant to space activities as to other state activities wherever conducted.<sup>99/</sup> Again, if space is to be regarded as a place not subject to national sovereignty, there are valid analogies from customary law governing other areas which may well be applicable to activities in space.<sup>100/</sup>

As we have reported above in connection with claims to celestial bodies, the majority of the writers discussing the problem of a law for space have urged that space be regarded as res communis or res extra commercium, like the high seas.<sup>101/</sup> In terms of "status" this simply amounts to a denial that it is, under current conventions, subject to the sovereignty of subjacent states or capable of appropriation. Stated positively, it amounts to affirming a community policy of encouraging all non-exclusive, or sharable, uses of space. If space is not subject to or capable of subjection to national sovereignty, then it is "free" to all users on terms of equality. The United Nations Committee, somewhat cautiously, agreed with commentators by stating that "there may have been initiated the recognition or establishment of a generally accepted rule to the effect that, in principle, outer space is, on conditions of equality, freely available for exploration and use by all in accordance with existing or future international law or agreements."<sup>102/</sup>

The primary difficulty with saying simply that space is "free" is that it says little more than that it is not subject to unilateral control and

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<sup>97/</sup> 265-66.

<sup>98/</sup> 389-99, 401-4; but see 172; see also the endorsement of the notion of "legal vacuum" in source 146, p. 147, where the term is used in a somewhat different sense.

<sup>99/</sup> Cf. 366-78.

<sup>100/</sup> See 313-64.

<sup>101/</sup> 703-11, 713-19.

<sup>102/</sup> Source 247 at 64.

regulation by some, or many, states claiming sovereignty over portions of it. In many respects the two possibilities--sovereignty of subjacent states vs. freedom, or exclusive use vs. sharable use--are almost polar opposites. In the one instance a state conducting activities in space can do nothing without the consent of subjacent states; in the other it can do anything not forbidden by international law. The second alternative is generally regarded as the more desirable; but, at the same time, it imposes obligations to work out standards and rules not necessarily in the form of explicit conventions, for implementing the policy of the international community in space. It is not enough to say that space is "free". That is a good starting point.

In recommending a legal regime for space some authorities, hoping to make fast a line from the known to the unknown, have suggested the adaptation of the rules that, regardless of their source, are thought to prevail in the law of the air,<sup>103/</sup> in the law of the high seas,<sup>104/</sup> or in the law of the polar regions or in particular regions of Antarctica.<sup>105/</sup> Few, if any, have proposed the literal and indiscriminate adoption of an entire body of supposed rules from any one of these special areas. Many have recognized, as has the U.N. Committee, that space is distinguished by many features, not all of which are now precisely known, that render many of its legal problems probably unique.<sup>106/</sup>

As compared with activity on the high seas, for instance, the present use of space exhibits fewer commercial and economic aspects; its military potentiality represents a relatively higher fraction of its present apparent total importance; the users for some time to come will be relatively few and will probably be, for the most part, governmental entities or international organs. This picture may change rapidly, as in the recently accelerated development of communications satellites; indeed, the rapidity of potential change in the uses of space serves by itself to distinguish the field from activities on the high seas. As compared with Antarctica, space represents, of course, a vastly greater area, of less well defined limits, susceptible of exploration--to say nothing of permanent settlement--only under very different conditions.<sup>107/</sup> As compared with conventional air space, the distances and speeds and times involved in the use of outer space are different; the methods of launching and, eventually, of landing are different; the effects of gravity and of radiation are different; the military threat is of a different character and, for the time being, of a different order of magnitude; the commercial and economic possibilities are less well known, though potentially even more extensive, than those of aerial transportation.<sup>108/</sup>

The futility of mechanical adoption does not mean that the experience of decades or centuries in these other fields is irrelevant to the control of space. On the contrary, reflection on that experience mutatis mutandis will help to anticipate problems of space and suggest ways of dealing with them. Particular solutions or devices may commend themselves for adaptation; historic failures may enable us to guard against repetition. The law of the sea may afford some hints for the accommodation of inclusive uses like navigation (space flight), fishing (exploitation of

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<sup>103/</sup> 313-16, 320.

<sup>104/</sup> 339-44, 360.

<sup>105/</sup> See text at note 83 supra.

<sup>106/</sup> E.g., 345-46, 348-53, 357, 360-62.

<sup>107/</sup> 364-65.

<sup>108/</sup> See generally 318-30.

mineral or energy resources), and cable-laying (communications) to defensive or exclusive uses like naval manoeuvres, protection of customs, and protection of neutrality, and vice versa. Rules of space navigation may draw upon the experience of the law of the sea and of the law of air space. Decisions on the registration of space vehicles, and on the consequences of registration, may be facilitated by a look at the successes and failures of similar efforts in air law and maritime law. Recent experiences in Antarctica may tend to show that in certain circumstances international cooperation and national enterprise are furthered by the conscious and agreed absence from pressing claims to sovereignty.

In general terms the objectives of rules regulating space activities are those which, in addition to their independent validity, are expressed in the Charter of the United Nations. Even were these objectives not expressly stated as binding legal norms, they would be the goals of decent men everywhere, to be pursued at every level of public or private activity, national or international. Articles 1 and 2 oblige those nations that have and will have space capabilities to conduct their programs in a manner consistent with the principles and purposes of the Charter. It is clear that space itself and the knowledge gained from space exploration should not be used for aggressive purposes; that disputes that may arise from space activities should be settled "by peaceful means in such a manner that international peace and security and justice, are not endangered"; that, in short, the mere fact that an activity is conducted in outer space does not release any nation from its existing international obligations to promote, and to cooperate with others in promoting, peace, justice and human dignity for mankind.

The problem is to give more explicit content to these objectives and principles asserted in extremely general terms. How do states assure one another that activities in space are not aggressive; that the activities of one state will not unreasonably interfere with legitimate activities of another; that activities will not be negligently or haphazardly conducted in such a way as to endanger others; that the benefits of space science will be widely shared to the benefit of all mankind; that such activities will not be incompatible with legitimate interests of states, whether or not subjacent, in which, or on which, the activity has some impact? No state may exclude another from access to space if space is free and open to all. But how does the community of nations lay down meaningful rules to state the terms and conditions upon which states should or should not conduct particular activities? Those are the problems of a realistic law of space.

We have suggested that the international community is on its way to the rejection of a spatial regime in which each of the several states may veto activities in a particular location, and to the adoption of a regime that, in broad terms, permits space activities unless prohibited.<sup>109/</sup> That leaves many questions unresolved and is a matter of understandable concern to all states with a potential stake in this vast, sharable resource. A state that believes itself adversely affected by the space activities of another will demand a voice in the conduct or control of those activities, or in the establishment of standards for such conduct or control. This is one of the reasons for the difficulty in drawing the "boundary," for, if all else fails, an affected state may attempt to insist that its sovereignty extends to very great heights, or indefinitely, as a device for claiming a voice in a particular activity.

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<sup>109/</sup> See generally 644, 647, 650, 653-57.

Agreement on a low altitude boundary, if achieved and if adhered to, could forestall this, but the preceding analysis has indicated that such agreement is unlikely and would not correspond to the needs of all or most affected states. Even if a general boundary agreement were contemporaneously or subsequently modified by the extension of contiguous source, the irrelevance of vertical distance to most of the pressing problems would keep alive the concern of affected states over many of the activities that would be taking place.



One obvious device would be a system of international control. But this is difficult to accomplish, and even in its absence it is important to press on with space technology and science, which might be unduly hampered if non-launching states sought to impose unjustified restrictions. Perhaps modest international schemes can be soon adopted. In any event cooperative discussion may help to moderate unilateral decisions by space powers and set up functional criteria in furtherance of the objectives common to all mankind.

b. The Problem of "Peaceful Purposes": Military Uses

In some respects the problems of space resemble the problems of the atom. The interest of mankind in the peaceful uses of atomic energy may be compared to its interest in the peaceful uses of space.<sup>110/</sup> Like virtually every atomic activity, virtually every activity in space has a possible military connotation; military and non-military uses are extraordinarily interdependent. The scientific knowledge relevant to atomic power was, broadly speaking, equally relevant to atomic bombs; the possession of fissionable material for power plants created a possibility of possession for military purposes. A similar interdependence of uses and objectives exists with regard to space activities. Scientific knowledge about cosmic radiation may be useful for radiological warfare; television and radio relay stations may be used to hinder as well as promote communication; geodetic and meteorological observations have the same potential duality of function; and much of the technology relevant to the exploration of space is equally relevant to the launching of intercontinental ballistic missiles or the stationing of weapons in space.<sup>111/</sup> This interdependence of military and non-military uses, while extensive, does not of course preclude all comparative characterization in terms of objectives, and such evaluation may become more accurate and reliable as experience and knowledge develop.

Nor are those problems peculiar in kind to space and the atom. A panoramic view of the high seas, seen through time and space, shows a history of efforts to exclude, falling before a sounder policy of encouraging sharable uses and opening this great resource to all, only to have in our time a new crop of unjustifiably extensive claims to exclusive rights. It, too, is a history of interdependence of non-military and military uses, and of efforts by the community of nations to state norms of use in peace and war which limited unilateral action where unjustified by self-defense or, in earlier times, by legitimate uses of violence.

In modern times, we have seen new aspects of old problems in the controversy that has surrounded matters such as atomic tests in the Pacific, controversies which are obviously close to those involved in comparable space activities. In 1946 the United States, despite the monopoly that it then possessed over atomic knowledge and successful atomic experience, took the position (in the Baruch proposal) that nothing less than definitive, enforceable international control of atomic energy could be counted on to achieve the objectives of the Charter, and that nothing less than foolproof international inspection and enforceable regulation of atomic activities was consistent with either the aspirations of all men for peace and security or the right of self-defense inherent in customary international law and recognized in Article 51. In common with many other nations, the United States has taken the same position with regard to space activities. Without enforceable and effective controls, the United States must beware of unsafeguarded agreements that might not deter violators but at the same time could

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<sup>110/</sup> Cf. 25.

<sup>111/</sup> See generally 19-20.

foreclose us from taking steps necessary to preserve our national existence.

Space power is military power, too, and in the future it may become the decisive element of all military power.<sup>112/</sup> Until an appropriate inspection and control system can be created by international agreement, nations can work toward the fullest international cooperation in peaceful uses of space and space technology, as in peaceful uses of atomic energy, only in the shadow of its potential for aggressive military use. They must, therefore, act within the legal framework of the Charter and of customary international law, imposing positive duties upon states to pursue the paths of peace.<sup>113/</sup>

In this connection an important point may be made. Nothing in the Charter prevents the maintenance of an efficient and modern military establishment or declares the mere ability to defend one's self inconsistent with positive obligations toward peaceful settlement of disputes. Article 51 is not an exhaustive statement of the rights of self defense and does not preclude the lawfulness of such devices as contiguous zones for security. There is, thus, no need to rely exclusively upon Article 51 to justify the capacity of the United States, and of its allies, to defend themselves against attack or even the threat of attack by maintaining a sufficient force in being.

One difficulty is that the word "peaceful" is used in various contexts. In the sense of the Charter, and in international law generally, it is employed in contradistinction to "aggressive". It seems to have been used in this sense--which we believe to be a proper one--in various Congressional resolutions dealing with space activities. Thus any use of space which did not itself constitute an attack upon, or threat against, the territorial integrity and independence of another state would be permissible; the high seas, for example, can be used for the maintenance of a naval force-in-being without any violation of international law, and may be employed "peacefully" for manoeuvres and testing of weapons. The word "peaceful" has, however, been used in other contexts; for example, it is used in the agreement setting up the International Atomic Energy Agency in the sense of "non-military." And it may have been used in this same sense in the efforts, referred to above, to insure that space is used only for "peaceful purposes." A disarmament agreement, which the United States Government has been seeking through the United Nations, implies a system of control that seriously inhibits military usage and limits it in specific ways. By the same token, a United Nations Committee on "peaceful uses" of outer space cannot, without impinging on the terms of reference of its disarmament counterpart, attempt to classify definitely what uses are "peaceful" in the sense of being contrasted to those that raise problems of international control aimed at insuring security.

That the problem is in part a semantic one does not make it less real. For the time being it seems that the only uses of space that are prohibited are those that fall within the prohibition of the Charter, and that until a disarmament agreement dealing with space activities can be arrived at, the United States is justified in using space for non-aggressive military uses consistent with the terms of the Charter. Such use is clearly in accordance with existing international law, and the United States would have no embarrassment in asserting that it is "peaceful". Whether it falls

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<sup>112/</sup> 433-36.

<sup>113/</sup> 23, 25.

without the jurisdiction of U.N. Committees employing the word "peaceful" in another sense is irrelevant to its characterization in general.

To compare the course of thinking on space law with the early history of international air law may be hazardous for several reasons, one of which is that we cannot now know whether the period from 1956-1960 is best compared to (say) 1901-1910 or 1901-1914. One tentative contrast may be suggested. Both then and now, the security-threat has assumed progressively greater importance in the literature. Both then and now, considerations of security seemed to call into question the desirability of a regime of uncontrolled overflight.<sup>114/</sup> The responses, however, may well prove from the vantage-point of tomorrow's historian to have differed significantly. The main response in the first part of the century was to establish the exclusive sovereignty of the underlying state; the main response today is to focus attention on international control or regulation. The reasons for this contrast, if it is accurate, must be found, we submit, only partly in the physical and psychological difficulty of projecting sovereignty far "out"; they lie also in the massive changes that have taken place in the past fifty years in the structure of the international community, the increasing consciousness of interdependence, and the substantial though uneven progress made in the techniques and efficacy of international organization. If conventional aircraft were to be invented only in 1961, and if we could imagine that all the rest of twentieth-century history had been as it was, it is arguable that the international community would not hit upon airspace sovereignty as we actually know it.

Until and unless all space activities can be brought under unified international control, we can safely assume that space programs will continue to be carried on by nation-states individually and perhaps (as with atomic energy) collectively as well; that these programs will increase in scope, intensity and frequency; and that they will develop basic scientific knowledge of great though now unpredictable significance to mankind, and technology which may be employed to a variety of non-military as well as military ends.

The factual interdependence of non-military and military uses of space and space technology complicates the tasks of creating a legal system in line with our basic goal. It cannot but affect the legal doctrine relevant to particular activities and the role and power of international institutions that can now be created; but it does not raise an insuperable obstacle to international cooperation in setting up legal principles and institutions governing many space activities. Experience with regard to similar problems raised by the atom indicates the broad and worthwhile areas in which cooperation can be achieved, as well as the limits imposed by considerations of national security.

The reluctance of some states to assert unequivocally that national sovereignty stops at a relatively low altitude and beyond that point space is "free" lies partly in the fear that the two space powers might act immoderately with regard to each other, or might do things in space which non-space powers regarded as inimical to their interests.

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<sup>114/</sup> E.g., 128, 148, 614, 616, 618, 621, 627.

Hence their emphasis on a legal regime which insists that uses of space be "peaceful," that space powers act "reasonably," that due regard be given to principles of "equality," and so forth.<sup>115/</sup> While they do not appear to desire a regime that would allow to each subjacent state an unqualified veto (the effect of unlimited sovereignty in space "over" territory) neither would they wholeheartedly approve a regime that authorized the space powers to decide unilaterally (or even, conceivably, bilaterally) what was permissible. In this connection it is worth recalling that the law of the sea, which many urge as the most appropriate analogy, was worked out over the years by a variety of doctrines adjusting special claims of coastal states to the common interest in free access, navigation, and so forth. We can expect, and perhaps anticipate, similar developments in space.

At the same time, as many have pointed out, the facts of space are in many ways distinguishable from those of other areas; as yet we have relatively little knowledge of the difficulties that may arise and the measures that might best be taken to promote the objectives as to which there seems considerable consensus.<sup>116/</sup> Lawyers can contribute significantly to the solution of legal problems arising from known and predictable contingencies;<sup>117/</sup> they cannot sensibly recommend in detail rules to deal with contingencies wholly or largely unknown and beyond human experience. With the gradual accumulation of experience and speculation we shall become better able at least tentatively to state the main legal problems in their relationship to facts, on the one hand, and the objectives of the United States and of the international community on the other.

#### B. Selected Legal Problems Arising from Space Activities

A number of writers have urged that we work towards a code of space law.<sup>118/</sup> Others, including governmental representatives, have preferred to take problems one at a time rather than attempt what they regard as a premature codification.<sup>119/</sup>

Clearly there is consensus that uses of space should be subject to rules of law, whether or not they now are, and that the objectives of shared benefit for all mankind should be pursued through international cooperation and regulation of some space activities.

From this, however, it does not follow that the time has come to draw up a code of rules for the use of space. The rule of law is neither dependent on, nor assured by, comprehensive codification, which may help or hinder depending on circumstances. At present we know very little about the actual and prospective uses of outer space in all their possible varieties of technical significance, political context, economic utility, and military advantage. In this situation an effort to agree on any comprehensive code might either come to naught, or yield a small set of

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<sup>115/</sup> Cf. 448-49, 451-53.

<sup>116/</sup> E.g., 181, 186, 192, 333-35.

<sup>117/</sup> 170-71.

<sup>118/</sup> See 129-52, 179, 187.

<sup>119/</sup> 180-82, 184, 186, 189-95.

pious maxims of extreme generality, or produce an unworkable regime that would be all the more dangerous for giving the temporary illusion of certainty. It should be kept in mind, also, that in the present loose structure of relations among states a multilateral convention once agreed upon would be no easy thing to amend when circumstances called for its amendment.

A detailed and comprehensive code, or convention, to govern the use of outer space would seem to be premature and might even be harmful today.<sup>120/</sup> The idea can properly be reserved for periodic re-examination in the light of new facts; among other things, the labors of scholars and scientific and legal groups may in time contribute to a state of affairs in which the preparation of such a code could be realistically considered. Meanwhile, it is fitting to take particular problems already raised by activity in outer space or looming in the near future and to discuss the wisdom of various measures, including express international agreement, proposed for dealing with them.

The U.N. Ad Hoc Committee, in 1959, rejected as premature the notion that states should now attempt to codify, directly or indirectly the Law of Space. It pointed out that the law of the sea and air space might provide "fruitful analogies" but that "outer space activities were distinguished by many specific factual conditions, not all of which were now known, that would render many of its legal problems unique." It affirmed the applicability of the Charter to space activities.

In line with this approach, the U.N. Committee listed six general questions as "susceptible of priority treatment." These were (1) Question of Freedom of Outer Space for Exploration and Use; (2) Liability for Injury or Damage Caused by Space Vehicles; (3) Allocation of Radio Frequencies; (4) Avoidance of Interference between Space Vehicles and Aircraft; (5) Identification and Registration of Space Vehicles and Coordination of Launchings; (6) Re-entry and Landing of Space Vehicles. Equally important, it classified as "Other Problems"--that is, not susceptible of priority treatment--the following: (1) Question of Determining Where Outer Space Begins; (2) Protection of Public Health and Safety; Safeguards against Contamination of Outer Space or from Outer Space; (3) Questions relating to Exploration of Celestial Bodies; (4) Avoidance of Interference among Space Vehicles.<sup>121/</sup> In each case, the Committee limited itself to identification of the problem and did not, save by indirection, attempt to pronounce the relevant doctrinal standards.

Only a few of these questions have been discussed in any detail in the existing literature. However, it is perhaps useful to review some of the conclusions and recommendations which have been made even if, as with the U.N. Committee, little more has been done than to identify and state the problem.

#### 1. Radio Spectrum Management

Radio-equipped space satellites and projectiles raise new problems relating to the allocation and use of radio frequencies and power specifications.

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<sup>120/</sup> See 180, 184, 189, 193-95.

<sup>121/</sup> 162.

Previous international agreements and custom which allocated frequencies on a geographical basis have been partially outmoded as to outer space. Law relating to international radio spectrum management may have to be amended and adjusted to take account of new conflicts and new capacities made possible by radio broadcasting from objects in space. For example:

(1) Tracing of radio-equipped space vehicles is of scientific importance to space exploration. Typical methods involve identification on wave-lengths that will be known in advance. It is important to the success of scientific experiment to know what wave-lengths may be used without interfering with other space programs or with other normal radio activities. Present arrangements, in part related to informal agreement by cooperating IGY scientists, are obviously ad hoc and of limited capacity. Any large increase in space activities will overburden existing facilities and result in disputes over the propriety of using a particular frequency.

(2) Radio-equipped satellites with self-generating equipment may continue to emit signals almost indefinitely, thus "using up" a frequency for years--perhaps centuries--unless standards, e.g., for automatic cutoff, are recommended, adopted and followed. The allotment of a limited frequency band to each nation engaged in space activity will encourage caution in such uses.

(3) A failure to allocate frequencies for national space programs increases the difficulty of prescribing norms with regard to either intentional or unintentional jamming of communication facilities. Interference by one state with another's space program, or interference by space vehicles with normal communication channels, could lead to retaliation and a serious dispute.

What has been said could be extended but is sufficient to indicate the need for radio spectrum management under legal norms based on informed scientific appraisals and recommendations. The U.N. Committee took note of the problems of radio frequency allocation and termination of transmissions that have outlived their usefulness and called attention to the technical studies to be presented in August, 1959, to the Administrative Radio Conference of the International Telecommunications Union. A detailed analysis of the work of the Conference may be found in Dr. Wenk's study prepared for the Senate Committee on Aeronautical and Space Science.<sup>122/</sup>

## 2. Conservation of Space

There is scientific opinion to the effect that a state with space capabilities could propel into orbit a large quantity of "junk" (for example, radioactive waste) the effect of which would be to preclude much further scientific experimentation and increase the hazards of space travel and the possibility of surprise missile attack. Such a program would overload tracking facilities and could distort communications. Presumably an effort would be made to justify it as a measure of self-defense.

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<sup>122/</sup> Source 205. Radio spectrum management need not be conducted wholly by a process of governmental or inter-governmental fiat. It has, indeed, been suggested that for the most rational use of the valuable resource that the radio spectrum constitutes, some resort should be had to the pricing mechanism so that frequencies could be, within limits, sold off to the highest bidders, whose bids would be the best evidence of the social value of the respective uses. See e.g., COASE "The Federal Communications Commission," 2 Journal of Law and Economics 1 (1959) and references cited there.

It is important that all nations with space capabilities use them with discretion and reserve in the interest of future scientific and technological programs. As space capabilities increase, the possibility of an iron curtain holding back scientific progress for years to come increases as well. Steps to limit the number of satellites that can be put into orbit and to furnish some assurance that each serves a useful function would be constructive contributions to the law of space. It would be unconscionable to future generations for us unnecessarily to hamper their opportunities.

### 3. Radio and Television Relay Satellites

It has been predicted that space may be used to establish a world-wide network for point-to-point communication and for broadcasting, through the use of satellites carrying relay equipment.<sup>123/</sup> This possibility will raise problems of frequency allocation. In addition it may have repercussions on program content (censorship), use by commercial entities, application of laws regarding defamation, and the allocation of costs among governments and between governments and users. Again the prospect of jamming occurs, both in the form of interference with programs being relayed and in the form of the improper use of relay equipment to interfere with local communications.

Much of the experience and law already familiar in other areas may be applicable to situations in space. But not all the experience has been productive of satisfactory legal norms, and space techniques will make what have usually been bilateral conflicts into multilateral ones. Generally, analogous difficulties have arisen between adjacent states; soon, in respect to this problem, states widely separated on the earth's surface will be brought into direct and immediate contact.

It is common knowledge that the United States has deep-rooted convictions and policies about the importance of free communication among peoples everywhere. The advent of a world-wide network of communications could be a gigantic step forward in bringing the people of the world into contact, which might in turn help promote understanding of one another's culture, ideas, and problems. Therefore, this predictable miracle in communication should be studied and analyzed further with a view to recommending the necessary rules and procedures that will allow it to proceed with a minimum of friction and dispute.

### 4. Weather Forecasting and Control

A number of problems may arise in the use of space for weather forecasting and, possibly, weather control.

All nations have an interest in accurate weather forecasting. For security reasons, some may be reluctant to acquiesce in foreign national satellites for weather forecasting if these remain exclusively under national control without effective assurances of free and accurate dissemination of all information. Possibilities for resolution of this difficulty include duplicate facilities, bilateral collaboration (A's satellite transmitting to B's read-out station), international controls, and agreements as to the nature and content of information to be disseminated by the operating state.

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<sup>123/</sup> 471-72, 733.

The possibility of power over some weather conditions raises more difficult problems. Some, however, may be readily resolved; for example, the breaking up of conditions likely to produce local disasters such as hurricanes may be technically feasible without substantial harm done elsewhere. If science enables us to alter climate in important ways, virtually all aspects of life will be dramatically affected and all states will be rightly concerned. It may be difficult to agree on standards where weather-control would have far-reaching effects on crop production, for example. Analogous problems have arisen from efforts to create rainfall through cloud-seeding, and give some evidence of the difficulty of balancing the various interests involved.

Other problems may arise out of the fact that satellites used for forecasting may have a capacity to perform other functions; for example, to observe parts of the earth's surface.

#### 5. Damage to Subjacent States, Aircraft and Vessels: Safety Standards

Space vehicles and space craft must travel for at least some periods within altitudes sometimes used for normal air travel. Recovery of space craft creates at least a possibility of surface damage if the place of recovery is miscalculated. There is also the possibility of misfiring and failure of safety equipment to operate satisfactorily.

The possibility of agreement on safety standards (notification of firings, policing areas of danger on the high seas, safety equipment on missiles to insure harmless destruction in the event of misfire) might usefully be explored with a view to minimizing dangers to non-participants and creating standards of care that would have to be met to avoid entailing state liability. In addition, it may be possible to specify situations where states should be willing to assume absolute liability, regardless of negligence, for certain kinds and amounts of damage arising from space activities.<sup>124/</sup> The U.N. Ad Hoc Committee suggested in this connection that early consideration should be given to agreement on submission to the compulsory jurisdiction of the International Court of Justice in disputes between states as to liability of states for injury or damage caused by space vehicles.

#### 6. Repossession of Space Craft and Repatriation of Space Personnel

Through miscalculation a space craft or "ship" may be brought back to earth in a country not intended as the place of landing. What standards shall be applied to determine the duty of the state of landing to return the equipment and repatriate any personnel, without invoking various local statutes? Agreement in advance on these points seems both possible and desirable in the interest of reducing areas of dispute and tension.<sup>125/</sup> As the U.N. Committee noted without making a definite recommendation, rules of international law already exist on rights and duties with respect to aircraft and airmen landing on foreign territory through accident, mistake, or distress; these rules may well deserve to be applied in the event of similar landings of space vehicles.

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<sup>124/</sup> See generally 411-31.

<sup>125/</sup> See 501-2.



## 7. Observation Satellites

A number of writers have mentioned the possibility of satellites with relay television cameras capable of observing the earth in considerable detail.<sup>126/</sup> The United States project Samos has this objective. It has recently taken on considerable importance because of the U-2 incident of May, 1960 and subsequent developments.

It will be recalled that the Soviet Government characterized the U-2 as "aggression" and strongly objected to its activity--aerial photography--as well as to its intrusion into Soviet air space. Immediately after the Security Council debates, the latest Soviet disarmament proposal included as a first stage of "disarmament" the cessation of aerial reconnaissance, which may be some indication of the importance the Soviet attaches to the preservation of secrecy. The Soviet Union viewed reconnaissance as aggressive on the theory that its purpose was to locate and identify targets. The United States characterized it as essential to self-defense and helping to deter aggression by its capacity to identify in advance activities that might be of an aggressive nature. The polar characterization of the same events indicates some of the difficulties in present doctrine. Reconnaissance might serve either purpose, or both purposes, and various kinds of reconnaissance devices might have different utility for the two purposes.

Possibilities for resolving this difficulty of characterization may exist in setting up and equipping a United Nations Reconnaissance Unit. In Paris after the breakdown of the Summit Conference in May 1960, President Eisenhower stated that he planned "in the near future to submit to the United Nations a proposal for the creation of a United Nations aerial surveillance to detect preparations for attack." No definite proposal, however, was conveyed in the President's address to the General Assembly in September, where he only referred generally to the possibility of reducing the danger of war by miscalculation "in times of crisis, by the intervention when requested by any nation seeking to prove its own peaceful intention, of an appropriate United Nations surveillance body." One or more observation satellites (Samos, Midas, or other) or systems of observation satellites could be operated as trustee satellites on behalf of the United Nations to which the operating country would turn over all information obtained. Parallel unilateral activity need not be prohibited and might be supported as a check.

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<sup>126/</sup> See 496-500.

#### 8. Co-ordination of Space Programs

Connected with the problem of conservation, yet independent of it, is the task of co-ordinating national space programs for various purposes.<sup>127/</sup> Objects propelled into space must be tracked by tracking facilities all over the world if their scientific significance and technological performance are to be properly appraised. Phenomena in space precipitated by human agency often require co-ordinated observation and interpretation from many points on the earth. As we have already pointed out, the more objects in space and the more activities in space, the more difficult this task will be. In addition, as space programs advance in capability and dimension, the likelihood of near-simultaneous firings into related paths will increase. This contingency could lead to the mutual frustration of expensive and important experiments and argues for a common interest in cooperative efforts. It could result in more than the desirable amount of duplication of scientific experiment. One possible solution lies in proposals for advance filing of flight plans and co-ordination of launch times. It may be premature and unnecessary to spell out "rules of the road" in detail, but it is not too early to take first steps in the direction of creating legal norms and institutions that could avoid the contingencies even now to be foreseen.

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<sup>127/</sup> See 93.

C. International Organization for Space Activities and Space Law

Some space activities are already conducted internationally, in the sense that representatives or nationals of more than one state take part in them. Whether existing arrangements, many of them casual and provisional, should be altered, continued, confirmed, or imitated is a matter with which lawyers will have much to do although it is not usually regarded as a "legal" problem.

The forms of international activity in outer space may be determined, and will be affected, by the purposes, overlapping and perhaps in part conflicting, with which the activity is undertaken. Stated from the standpoint of the United States, but indirectly as well from the perspective of a larger community, some of those purposes may be briefly mentioned as follows:

Technical factors may require some type of international cooperation, if only in the form of agreement on the approach to take to specific problems. The U.N. Ad Hoc Committee listed, in its Report on Paragraph 1(b) of the General Assembly Resolution 1348(XIII), some illustrative topics for international agreement: use of radio frequencies, registration of orbital elements, continuing radio transmission, removal of spent satellites, re-entry and recovery of space vehicles, return of equipment, identification of origin, and contamination.<sup>128/</sup> For these activities, and others that might be named, international agreement seems necessary either because no one country has all the necessary technical facilities or possibilities, or because the particular activity is one where the objective depends upon the consistency of all unilateral action, as in the case of "decontamination".

Some forms of international space action can be used, from the point of view of a launching power, to obtain the benefit of scientific, technical, or even financial contributions of other nations, to share with other nations the burdens as well as the benefits of space activities, to give evidence of the peaceful intent of the launching power, to provide training for technical personnel on both (or on all) sides, to channel economic and technological developmental assistance, and to furnish a model for other kinds of international cooperation, for example in connection with disarmament or arms control.

Not all of these objectives are necessarily of equal importance or urgency; not all of them can be directly reflected in forms and methods of organization. Those may perhaps be determined by reference to other objectives, not necessarily less important than the "space-connected" objectives. The number of participants in any international organization set up for space activity can be bilateral, regional (bloc), multilateral, or global. The participating members may be governments or organizations of scientists, engineers, lawyers, etc. The powers of the organization may be weak or strong along a spectrum of relative "supranationality." The organization might be a specialized agency of the United Nations;<sup>129/</sup> it might be a committee of technical advisers to the General Assembly or to the Secretary General;<sup>130/</sup> it might in some respects resemble existing agencies such as the International Atomic Energy

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<sup>128/</sup> 162.

<sup>129/</sup> See 61-62, 64-65.

<sup>130/</sup> See 70.

Agency. It need not duplicate the work now being done, or capable of being done, in such quasi-official bodies as COSPAR, or in such other organs as the International Telecommunications Union, the International Civil Aviation Organization, or the World Meteorological Organization.<sup>131/</sup>

On the U.S. side, the National Aeronautics and Space Administration is engaged in four basic types of international activity, which one of its officials describes as operational, informational, joint, and personnel exchanges and training.<sup>132/</sup>

The operational programs consist of space probe tracking activities, conducted or about to be conducted in 19 countries abroad. Some of the stations are operated by U.S. technicians, some jointly with technicians of the host countries, some by foreign technicians under contract or grant arrangements. Informational programs are an outgrowth of IGY operations. Launchings of sounding rockets, satellites, and space probes are reported by various means; periodic catalogs of information are made; results of experiments are published and distributed, for example, through world data centers; NASA scientists take part in scientific meetings.

In March, 1959, the U.S. delegate to the meeting of COSPAR at The Hague offered on behalf of NASA a program to include experimental payloads, designed by foreign scientists, in vehicles launched by the United States; to launch satellites designed by foreign scientists, with agreed payloads up to a certain weight in a certain range of orbital altitude; and to invite space experimenters to work on their projects in the U.S. laboratories.<sup>133/</sup> A number of projects and plans have grown out of this initiative, and more elaborate joint projects are going forward with the Canadians and the British.<sup>134/</sup> NASA makes a small number of grants to foreign scientists (as well as domestic scientists) through the National Academy of Sciences for post-doctoral and senior resident associateships. In addition, NASA is endeavoring to provide laboratory support and guidance for foreign scientists, sent and supported by their governments, to work in U.S. space laboratories.

The scientific section of the 1959 U.N. Committee's report proceeded on the premise "that a principle of open and orderly conduct lies at the root of international cooperation directed towards the peaceful use of outer space."<sup>135/</sup> It calls for a rallying point related to the United Nations, small in size but well informed, "a center to which inquiries can be directed at any time, and by which information can be communicated effectively to the appropriate body in much the same way as ICSU meets a similar need for the existing international scientific unions."<sup>136/</sup>

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<sup>131/</sup> But cf. 33, 37, 44.

<sup>132/</sup> Frutkin, Statement before Inter-American Defense Board, Feb. 16, 1960 (NASA Release No. 60-124), pp. 5-6.

<sup>133/</sup> NASA, Second Semiannual Report to the Congress, pp. 60, (Mar. 14, 1960).

<sup>134/</sup> Transit II-A, the larger of the two satellites launched "piggy-back" on June 21, 1960 by the United States, carried among other things a space experiment for Canada in the form of a receiver to study background noises for the galaxies. See Wash. Post, 6/23/60.

<sup>135/</sup> See source 247 at 59.

<sup>136/</sup> Id. at 59.

The United Nations Ad Hoc Committee as a whole decided "that it would not be appropriate at the present time to establish any autonomous inter-governmental organization for international cooperation in the field of outer space",<sup>137/</sup> or "to ask any existing autonomous inter-governmental organization to undertake over-all responsibility in the outer space field." Its other organizational recommendations were on the whole limited to the setting up of study groups; it dealt with the "focal point" recommendations of the scientists by suggesting that "consideration might . . . be given to provision for a small advisory committee, advisory to the Secretary General, which could include representatives of the appropriate specialized agencies, scientists designated by international scientific organizations, and representatives of member states, as necessary."<sup>138/</sup> It noted the possibility of establishing a committee of the U.N. General Assembly, "composed of representatives of member states and having such membership as the Assembly may decide," to study international cooperation, to study legal problems, and to review, "as appropriate," the subject matter covered in the terms of reference of the Ad Hoc Committee.

Whatever organization emerges from these recommendations, even if they are confirmed by the re-constituted U.N. Committee scheduled to meet in 1960, is unlikely to possess formal powers to exert general regulation over national programs or make binding legal norms for space activities. Whether it will be able to make recommendations and suggest standards that may as a matter of optional acceptance be followed by states engaged in national programs remains yet to be seen.

Legal scholars have, in several instances, gone much further than the U.N. Committee in recommending international regulation, coordination, control, operation, or even ownership.<sup>139/</sup> Some of the recommendations appear to proceed from a preoccupation with particular difficulties or conflicts, in particular the security threat. Others appear to have proceeded from political objectives, not necessarily "space-connected". Still others appear to be based on a desire to abolish the complexities that make international cooperation difficult and a belief, not always expressed or examined, that the maximal "internationalist" solution would be tidy and comprehensive. Here, one might say, the objective is not so much political as anti-political.

The present Report does not contain any recommendations on the form of organization of an international agency for space, or even on the future desirability of such an agency. We would make two points that seem particularly relevant to the present stage of space activity and organization for space:

(a) It is at the level of fact, as it seems to us, that an international agency of some kind, able to draw upon the talents of highly-trained scientists to appraise possibilities and alternatives, can play its most useful role in promoting legal standards for national or other space programs. Such a group could help to mobilize the talents of the international scientific community in making responsible recommendations for the consideration of national states, either as a basis for subsequent formal international agreement or as a consideration that will be relevant to unilateral decisions. It would not thereby supersede national authority and control.

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<sup>137/</sup> Id. at 74.

<sup>138/</sup> Ibid.

<sup>139/</sup> 51, 52, 62, 64, 65, 70, 74; cf. 53, 54. See Source 137, pp. 273-82.

(b) If an international organization, existing or to be established, is to conduct any space operations, as to which we likewise make no recommendation, it may usefully begin by appropriate provisional arrangements with states having space capabilities. Such arrangements might take the form of trust agreements, the operation of vehicles being carried out under terms and conditions roughly comparable to those presently applicable to trust territories; or they might take the form of "guest payloads," prepared by international bodies but launched on their behalf by particular national governments.<sup>140/</sup> They might be particularly suited to the operation of space vehicles and space craft for some of the purposes canvassed in subsection B above, and this operation might promote agreement on norms and procedures applicable to purely national space activities. The "provisional" arrangements, like other "provisional" arrangements, might turn out to have unexpected lasting qualities.

International agreement on the problems raised in this report is not a prerequisite to national activity in space, unless the term, "agreement" is interpreted broadly. On the other hand, states should act reasonably and with moderation regardless of the presence or absence of formal legal norms. To the extent that workable formal agreement can be achieved, difficulties and friction may be obviated thereafter; even an unsuccessful attempt to reach such agreement on a well-defined set of practical, impending problems may be helpful in the making of national decisions if it influences states with space capabilities to conduct their space activity in such a way as to avoid major disagreements and reduce international tension. The area of disagreement at the negotiating table may prove to be narrow by comparison with the area of agreement; the number of states taking one position may be shown to be insignificant by comparison with the number taking a different position; the reasons urged in support of one position may be far more persuasive to the international community than those urged for another; that subject-matter in which the difference of opinion relates to soluble technical questions may be separable from others. By clarifying and proposing legal arrangements within the modest scope set out in this report, lawyers can contribute, in common with public officials, to fostering a climate in which durable institutional machinery and eventually, comprehensive codes for space activity can be launched when that appears practical and necessary. In the same spirit, the United States may well be urged to encourage parallel international and national activities whenever security considerations permit.

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<sup>140/</sup> See 503.

## II. ABSTRACTS

The following Abstracts are brief summaries of writings that were read in connection with this report. The Abstracts contained in Part A are summaries of those writings which contain direct discussions of the problems of space law. Part B contains Abstracts of writings that do not refer directly to space law problems, but refer to the technical problems to be encountered in space, or to fields of law of collateral relevance, such as air law. For the convenience of the reader the Abstracts are arranged under broad topical heads and sub-heads.

The indexes contained in Part III are provided to enable one who is interested in a narrower topic, such as the impact of the X-15 on existing boundary proposals, to go directly to the abstracts on that topic. Index A refers to the Abstracts of writings that directly discuss the problems of space law, and Index B refers to the Abstracts of writings on topics of collateral relevance.

The Foreword of this report, in section B, Scope and Origin of Research, indicates the origin and function of the abstracts. It should be repeated that the abstracts are not presented as an adequate substitute for the statements made in the abstracted works, whose language they usually do not follow directly and whose context is often essential to an exact understanding of the points being made. As many of the topics covered are matters of dispute, some abstracts contradict others. The aim of the abstractors was not to document a position but to reflect the literature.

## A. DIRECT DISCUSSIONS OF SPACE LAW

### ACTIVITY

#### A. Factors affecting

1. Achievements in space may increase the importance of time for the planning of human affairs, affect legal analysis, and the aging process.
2. Three factors will determine the extent to which any one nation will be able to control and exploit space: the speed, the altitude, and the staying ability of the nation's space vehicles.
3. Original religious hostilities to space travel and space exploration seem to have been dissolved by the fact that the 7th IAF Congress took place in Rome and was welcomed by the Pope, who said that it was natural for man to explore the Universe around him.
4. Rockets and other space craft are vehicles which are obviously designed and built for travel in outer space. It is vital for the legal concept of outer space craft that its destination for outer space must be recognizable and obviously sound, while no difference should be made between unmanned and manned flight vehicles.

#### B. Financing

5. The great public interest in and the commercial use of space craft and the exploration of outer space will justify regulations favoring the financing and development of space flights with public funds.
6. Private entities within a nation or in more than one nation may marshall sufficient funds for commercial or scientific activities in outer space, though such users will probably depend on the launching facilities of national governments.
7. A discussion of the cost of rocket research and development. The author shows that due to the tremendous sums involved and cost of outer space research and development must be borne by the public and financed with defense funds.
8. If a space craft is financed by the voluntary contributions of many people from different nations, regulations should be devised providing for the close accounting of these sums and for the prevention of unhealthy speculation.

#### C. Interplanetary flight

##### a. regulation of

10. Rules determining who may enter space should be based upon the realities of space flight, and not upon considerations of national internal self-interest.



11. The "right" to leave one's country is not the same as the right to leave the earth. Denial of such a right must be based on the nature of space travel and the character of the individual. The passengers should decide who they will take with them.
12. Even though the space traveller is not bound by air laws and regulations, he has to obey the universal rule of "due care," hence he will have to take into account air regulations and obey them in order to avoid endangering air traffic.
13. The landing and take off of space craft should be put under close scrutiny and regulation as to safety of the vehicles, time of leaving, projected route, weather conditions, etc.
14. The space traveller will have the legal duty to provide for the harmless "disposal" of the used booster rockets.
15. The right of eminent domain should be given to the owner/pilot of a space craft or the agency controlling it for the purpose of appropriating take off and landing fields and for the construction of the space vehicles.

D. Uses

a. commercial

16. It is unlikely that private enterprise will be able to establish its own plan of space travel without very close military supervision.
17. The development of space flight will bring many commercial benefits. The scientific developments necessary to further space flight will filter down into everyday life. There can be satellite-based weather service to benefit agriculture, and new developments in practical medicine.
18. In the near future rocket cargo and passenger transport will be considered superior to airplanes for a distance of over 1000 miles.

b. interdependence

19. A condition of first importance in the development of outer space law is the extraordinary interdependence of scientific, military and commercial objectives that may be advanced by the same activities in space.
20. Unique to space exploration is the extraordinary interdependence of scientific, military, commercial, and other objectives that may be served by the same activities in space. Because of this interdependence, it will be difficult to pose legal solutions to jurisdictional and other legal problems which are premised on the basis of a supposed predominant category of risks.

c. peaceful

21. Space flight must necessarily bring about closer ties between nations and reduce the risks of war because of the great potentialities developed. The political advantages to any country in terms of bombing and reconnaissance are obvious.
22. New resources and economic potentials from space should be secured for the welfare of all people without discrimination. The interest of the under-developed countries should be recognized from the very beginning.
23. The emphasis in the exploration of outer space should be on the development of peaceful uses, and not the development of weapons. For this reason the U.S. space program should be under civilian rather than military control.
24. Interplanetary flight will bring about greater interdependence and closer co-operation of all the nations involved and at the same time a great increase in power for all humanity.
25. This article (written January 1958) urges that the U.N. should discuss control and peaceful uses of space before satellites are launched and fixed in the public mind as weapons of war. Eisenhower should make another appeal to the U.N. as he did in 1953 on the peaceful uses of atomic energy, but this time replacing "atomic energy" with "space."

d. scientific

26. The intellectual progress of man has always depended upon his ability to extend himself beyond the confines of his own world. Thus, the spaceship is today as essential as was the airplane 50 years ago if man is to get out of the closed system of the earth.
27. Sputnik II will be valuable to scientists in testing the theory of relativity and the nature of the ionosphere.

e. survey of

28. A brief survey of future activities that are not too early to contemplate: orbital satellites for radio and television relays, observation of weather and reconnaissance of earth; instruments-landing on the moon; manned space flights; mail or cargo delivery by rockets.

AGENCY

A. Enumeration of

a. IAF

29. An international agency should be convened to attempt to resolve conflicting claims over the legal status of space. Rather than concentrate on the status of space in terms of national sovereignty, emphasis should be placed on the civil uses of space.

29. (continued)

Such a conference might discuss: the filing of rocket flight plans; interchange of scientific information; workable schedules for using radio bands; navigations aids to space craft; and possible agreements regarding safe passage for scientific craft. The most appropriate existing agency to assume these functions is the IAF. The U.N. should not do the initial work because of the stamp of ineffectiveness which it bears.

30. The IAF should assume the job of coordinating world aeronautical strategy. In order to carry out this mission, the IAF should be reorganized to include the whole of the scientific world and other leading organizations which support it. The specialized agency thus created should be called the International Committee of Outer Space, and should give consideration to not only problems of space law, but also to the unification of all space research, and the promulgation of international specifications for all types of space vehicles. It should also promulgate specifications for navigational equipment, radio broadcasting, and flight plans.

b. ICAO

31. The Von Karman line is a primary jurisdictional line. But such definitions should be established by the U.N. and the ICAO with a committee of 4 physicists and 3 lawyers.
32. Many aviation law experts, such as Pepin, believe that arguments between nations over the use of space may be avoided by placing control of space in the hands of an international agency. Although the agency to handle such control is in dispute, one that has been often suggested is the ICAO. The agency would not only promulgate an official space code, but would undertake to control and coordinate such matters as search and rescue work, radio transmission frequencies, re-entry problems, etc.
33. Although ICAO would seem to be the most appropriate existing agency to handle the job of attempting to formulate an international code of space, its present work load and its specialized way of thinking make it doubtful that it is the proper agency for the job.
34. The legal problems created by spaceflight, as ascension and descension, property damage, collision, interference with communications, landing on other planets and the moon, and the creation of space stations, cannot be solved by any one nation, but require regulation by an international authority under the auspices of the U.N. or the ICAO.
35. An international regulatory agency is necessary to resolve the many practical problems of space that will arise in the immediate future. It should be established under the auspices of the United Nations and work in close cooperation with ICAO.

36. For two reasons the U.N. would be a better group than ICAO to decide rules governing the legal status of space; the membership of the U.N. is larger than the ICAO; and the problem of space contains many elements of political nature, which would be foreign to the technical nature of ICAO.
37. The ICAO is the proper forum to resolve problems of control and navigation in space. The fact that space may be used for non-peaceful purposes should not mean that these are problems which should be handled by a world military organization.
38. The ICAO was created to deal with problems concerning conventional aircraft. Without international agreement by the signatories to the Chicago convention, the ICAO may not engage in studying or attempting to regulate space flight.
39. Since the USSR is not a member of the ICAO, control of space cannot be effectively lodged with that body. Only the U.N. can serve as a forum for the discussion of rules to govern space.
40. The ICAO, working in conjunction with the U.N., should make the final determination of the Von Karman line -- that point at which air space comes to an end and outer space begins.
41. There is no need to create a new international body to promulgate rules governing outer space. A special department of ICAO would be sufficient to deal with the regulation of rockets and satellites.
43. A report presented to ICAO in 1956 says that an agreement on the use of outer space will have to be reached since no presently existing legal rules are adequate and since space travel will be an actuality. ICAO will be interested in this activity since all spacecraft must pass through the atmosphere on their way to outer space. See also: Agreement.

c. ITU

44. ITU Should be given the job of establishing controls and allocating frequencies for the use of radio in space. Also, ITU should be able to promulgate codes of radio use for the purposes of space transmission.

B. Function

45. An international agency should be formed for the joint exploration of outer space.
46. The problems of communicating with unmanned earth satellites should be solved through utilization of the existing international agencies concerned with space communication.

47. An international agency should be established modeled after the pattern of the IGY, to establish an international clearing house for information regarding space exploration and to survey and research into the legal ramifications that will result from the exploitation of space by different states in the world community.
48. An international organization should be created to establish regulations for landing procedure, navigational aids, and communications for space vehicles.
49. An international coordinated program, which the existing international organizations could provide, should be established to lay down and supervise regulations relating to the launching of satellites, the traffic of objects in space, liability arising from any possible collision and related problems.

C. Powers

a. in general

50. Although the law of outer space cannot be pre-fabricated, it is not too early to concentrate on an international organ to formulate and apply, at the proper time, the applicable principles of space law, so that international conflicts be avoided.
51. An international agency should regulate space flight and establish a code of conduct, since existing international law can be applied to space only by analogy. The ICAO should be used as a model. The agency should define the space limits, so as to make outer space free for all.
52. Absolute control over the exploitation and exploration of space, as well as rules and regulations for navigation, safety, and the operation of space vehicles should be vested in an independent world space authority.
53. The control of outer space by individual nations through an extension of the ad coelum doctrine is obviously impractical; international control is necessary. Ultimately an international agency should own and operate all spacecraft. For the short term, all spacecraft operated by individual states should be registered with such an agency.
54. A space authority must be established, initially with powers only to regulate landing and take-off, but ultimately to license all space travel. It would establish regulations according to universal principles of freedom defining public and private liability for damage, protection of inhabitants of other worlds, with jurisdiction over the earth and spaceships in space. Colonialism in space would be forbidden.

b. trustee satellite

55. A space station could be used to watch over all nations to see that they do not prepare for war. It should be operated by an international agency. (Schacter)

56. Ownership of all space platforms or stations should be held by an international agency to prevent their use for wrong ends. See also: Trustee Satellites.

D. Staffing

57. Although it is imperative that an international agency be responsible for the control of outer space, which particular agency handles the job is not important.
58. The control of outer space should be handed over to some body of the United Nations or one linked with it. The juridical aspects of such control should be assumed by the International Law Commission with the assistance and advice of ICAO, WMO, ITU, ICSU, and IAF.
59. The body which should take the most active lead at this time in developing a code of space law to provide norms for the exploration and exploitation of space is the United States Air Force.

E. United Nations

60. It has been recommended that the U.N. undertake the responsibility of administering outer space.
61. A special commission of the U.N. should be established to attempt to reach an understanding among all nations on the question of international sovereignty over outer space.
62. The exploration and exploitation of space should be demilitarized, internationalized, and controlled by a special U.N. space agency.
63. Outer space, even if subject to territorial annexation should be controlled, as is proposed for polar areas, by a United Nations agency. Similarly, artificial satellites, due to their formidable power, should be subjected to control by an international organization.
64. A specialized agency under the United Nations, or the United Nations itself, should regulate all space flight. The agency's composition should be similar to that of the Security Council.
65. An international agency should be established analogous to the International Trusteeship Council to control and regulate all interplanetary operations, including the activities of space vehicles and space platforms.
66. Sovereign equality in space can find adequate form only through international cooperation under the auspices of the U.N.
67. The United Nations should furnish the principal guarantee that upper space is used for peaceful purpose by all humanity.
68. Experiments in space exploration pose acute problems of national security and, therefore, the United Nations is the forum to deal with outer space exploration.

69. U.N. control of outer space can be furthered if: (1) world public opinion holds secret launching of missiles or satellites to be a direct threat to world peace; (2) the U.N. has radar stations throughout the world detecting high-altitude, high-speed objects; and (3) all observations of secretly launched objects are publicized immediately. See also: Observation; Uses, Peaceful.
70. Control of activities in space should be considered an international responsibility, and legislative authority over such activities should be vested in the General Assembly of the U.N. acting on the advice of a special U.N. Agency.
71. The question of the development of rules to govern activity in space should not be allowed to come before the U.N. in a hit or miss fashion. The matter should be placed before a special U.N. commission designed to provide a forum for the discussion of legal norms and to coordinate international research.
72. Establishment of an international committee for peaceful use of cosmic space under the aegis of the United Nations would ultimately facilitate the solution of such problems as identification markings and registration, elimination of radio and T.V. interference and regulation of outer space safety.
73. The United Nations should immediately set up a commission to study the legal aspects of the problem of the extent to which a state may exercise jurisdiction over its superjacent air space, and the UNESCO should correlate all learning on space flight in the realm of the natural sciences.
74. While recognizing the right of each nation to use outer space for peaceful purposes, the U.N. should establish a permanent United Nations Astronautical Agency (UNASTA) to prescribe uniform regulations concerning the use of space that will assist launching nations and reduce hazards to other users of outer space. The agency shall also establish subordinate groups, such as an Observation Corps and facilitate cooperation among nations.

Some of the services that may be provided by, and responsibility that may be vested in, such an agency are:

1. navigational and meteorological data, allocation of radio frequencies, information as to space hazards.
2. standard regulation of space vehicles and filing of flight plans.
3. standard identification methods.
4. effective space vehicles advance flight inspection.
5. launching U.N. satellites for common use and benefit of all nations.
6. "peace patrol" of reconnaissance satellites.
7. U.N. space stations.
8. maintain a technical data depository of non-military information acquired from space activities.
9. promotion of international cooperation in outer space use.

AGREEMENT

A. Content

75. Outer space must be free, like the high seas. But this does not mean that anarchy must prevail. Legal order will prevail, but not from an extension of national sovereignties. Rather it must come from international agreement. This international agreement must also fix the boundary between outer space and air space.
76. International agreement should be sought on the problem of ascending and descending spacecraft and the dangers of collision with aircraft and property damage, and on the problem of interference with telecommunications by spacecraft in orbit.
77. The development of space vehicles will pose increasing demands on frequencies, and their rational allocation is imperative in order to avoid paralysing interference. A measure that will help to conserve maximum use of frequencies allotted to outer space is the termination of transmission from space vehicles once these transmissions have outlived their usefulness. This measure, however, should be balanced with the interest of conserving a continuous means of space vehicle identification.
78. International agreement must be concluded, clearly defining what is understood by outer space, and requesting the right of flight as well as the nationality of space instrumentalities.
79. There must be an international agreement on the meaning of words and phrases which are used to define the jurisdiction of states in air and space law, for international space law cannot result from the sum of parts of diverse national laws on aeronautics and astronautics.
80. There is no obligation under international law for the return of a fallen space object to the launching state, and agreement on this problem appears desirable and ripe.
81. It is desirable that bilateral or multilateral agreements be concluded for the return to the launching state of the vehicle and for speedy return of personnel in case of manned flight. Certain substantive rules of international law already exist concerning the rights and duties in respect to aircraft and crew landing on foreign territory through accident, mistake or distress, and such rules might be applied in the event of similar landings by space vehicles.
82. The newly created law applicable to outer space and interplanetary flight will mainly be public law, i.e., concerned with the regulation of safety, health, etc.
83. We should now begin to think about a space-navigation code, a space-radio-communication code, and a space rescue code.



84. Three principles need immediate determination: (1) the height of a nation's territorial sovereignty; (2) the rules of navigation in space, and (3) the law relating to discovery in space. The determination of space law rules should be a matter of universal agreement; analogies drawn from existing law or from international law will be of little use.
85. The question of a boundary between air and outer space is not today a practicable subject for multilateral international agreement.
86. The existing legal hiatus in space can lead to serious international misunderstanding if permitted to continue. The basic problems which need immediate resolution are: (1) the national territorial status of flight space used in the launching and landing of space vehicles; (2) the legal status of these crafts once they are beyond the territorial space of the launching nation; (3) the regulation of areas beyond territorial space and rules for the passage and conduct of flight in such space.
87. The U.S. and the USSR should:
  - (1) renounce the military use of space;
  - (2) submit to the U.N. supervision of space and space projects;
  - (3) merge their space enterprises into joint terms;
  - (4) invite the other nations to join this adventure.

#### B. Cooperation

88. The inquiring mind of the scientist makes it inevitable that space exploration will become a reality. To avoid international scientific rivalry over the methods and means of making this so, an international rocketry society should be formed.
89. The participation of scientists of different nations in common space projects will result in a more rapid advance in the technology of space exploration, the acquisition of scientific data, and the development of law premised on the data obtained.
90. Major scientific problems cannot be successfully resolved without the organized exchange of information by scientists all over the world, and the high cost of research should also unquestionably provide an incentive for organized international collaboration in research. However, since space research is carried out by two systems, organized collaboration must be on a basis of parity--according to the equal status of the two systems. It is because of the violation of this principle in the composition of Cospar--placing the representatives of the Soviet system in an unequal position--that made Soviet participation in Cospar inadvisable.
91. Interplanetary flight will bring about greater interdependence and a great need for close cooperation between all the nations involved, especially in the field of financing future space travel.
92. The U.S. should take the lead in inviting all nations to a cooperative effort to explore space.

93. The time is ripe for an international agreement which will provide a framework for continued scientific collaboration along the lines of the IGY. Such a program would involve collaboration on such matters as flight plans, launching schedules, the allocation of radio frequencies, the sharing of scientific data, and so forth.
94. Congress should amend the law so that the United States may pool its scientific knowledge of missiles, rockets and certain atomic information with other NATO countries.

C. Factors

95. The choice among various legal arrangements for outer space is, in the last analysis a political decision. The political choice must be based, in part, on the assessment of the various possible regimes and their practical consequences in view of the nature of activities in outer space, and in part upon the international situation on earth.
96. The juridical aspects of space are ultimately related to political problems, especially in regard to the control of outer space. Hence the two questions must be studied concurrently, since solution of one may afford a basis for the solution of the other. Any solution will necessitate the friendly cooperation between the United States and the USSR.
97. The involvement of the question of space travel within the framework of disarmament proposals can only serve to confuse and delay the development of a body of space law. Problems arising from the exploration of space should not be allowed to become embroiled with international politics; they must rather be solved by agreement among nations acting in the best interests of all people.
98. Initial space exploration and progress will be limited almost exclusively to those two powers which possess the most advanced technology, the USSR and the U.S. Although these two powers will increasingly widen the technological gap between themselves and other nations through space exploration, the political implications of space exploration by these two nations will tend to have the reverse effect, each accretion of power by these two nations thrusting heavier responsibilities on their shoulders, and increasing the trend towards political multipolarity.
99. Military power and national wealth have little effectiveness as instruments of national policy in foreign affairs. The nation which first obtains international intellectual leadership by sponsoring and cooperating in scientific research will obtain a powerful advantage in shaping international policy.
100. The study of the legal aspects of outer space is likely to prove an absorbing but unrewarding intellectual exercise unless there is, first, agreement on the broad principles governing the utilization of outer space. One of the objectives to be enshrined by the law of outer space, is to ensure that exploration and exploitation of outer space does not become the source of international rivalry.

101. Agreement on many aspects of space does not hinge on the problem of disarmament and missile weapons. United States diplomatic opinion seems slowly to be coming around to this point.
102. Scientists and engineers may exert greater influence in decisional process than they used to do, and this influence may direct national policies toward universality and rationality.
103. International agreements cannot in themselves guarantee peace and order. Enforcement is a necessary consideration. We should be cautious not to enter into any agreements which are beyond the scope of our present knowledge or preparation. Limited agreements, however, are both possible and useful.

D. Form of

104. Express agreements would assure a more controlled direction to the development of outer space law than agreement by sufferance.
105. Many theorists assume that the only effective method of solving future international disagreements over the use of space is to adopt an international convention dealing with the policy and political problems which may be expected. A broad agreement of this sort under present conditions is extremely unlikely. Most likely, the participants in making authoritative international decisions will be the officials of nation-states. The process of decision will be affected by many of the same conditions that are relevant to the process of claim and decisions, for the most part, will be made by those who make the claims.
106. The best way to solve the problem of achieving international accord as to the legal rules to govern outer space is to have a world conference convened under the auspices of the U.N.
107. The U.N. should establish a commission to study the legal and jurisdictional questions of space and an effort should be made to reach an understanding among all nations on these questions.
108. The Chicago convention is premised upon the principle of absolute sovereignty over air space. Because a convention relating to outer space should be premised upon the principle of freedom of outer space, there is danger that the two conventions would conflict when applied to an instrumentality which maneuvers through both air and outer space, thus coming under the jurisdiction of both conventions. For this reason, any new convention dealing with the status of outer space should be drafted to amend the Chicago Convention, applying common rules and principles to flights both in air and outer space.
109. Bilateral contractual rights for free transit of aircraft should be applicable for manned outer space craft.

E. IGY

110. Traces the growth of the IGY, and outlines events immediately prior to the placing in orbit of the first Russian satellite.

111. The nations which are participating in the IGY, by agreeing actively to support the satellite program, have agreed to the legal validity of satellite flights over their territory.
112. The premise of the permissability of launching satellites during the IGY may have initiated the recognition or establishment of the principle that outer space is freely available for peaceful exploration by all in accordance with existing or future agreements.
113. Freedom of outer space rests on precedent established during the IGY. While IGY is not official in character, its activities have the approval of all governments. The implication of IGY, therefore, is that there exists a tacit and universal acknowledgment of the principle of outer space freedom.
114. International practice seems to permit the free use of outer space.
115. Free use of outer space has been ratified by international usage since neither the U.S. or the USSR sought authorization to send satellites to outer space and no government protested.
116. International practice has corroborated the free use of cosmic space. Absence of request of authorization to launch satellites and objections proves that the principle of free use of outer space has already gained tacit recognition by all states.
117. Lack of protest over the flight of American and Russian satellites does not signify the existence of an outer limit to territorial sovereignty, but merely consent of the subjacent states to conditional passage of the satellites.
118. Lack of protest against the United States and Russia does not necessarily establish a universally recognized principle of free outer space. Both countries launched satellites under the previously agreed programs of the IGY, i.e. with the preliminary consent of all the countries concerned.
119. State consent to IGY experiments signifies no more than that states have agreed to the satellite programme only within the context of current scientific experiments with their limited objectives.
120. The acquiescence of nations to the peaceful use of outer space implies that consent is either unnecessary or has been given. The view that consent is unnecessary is not warranted, since there is wide agreement that freedom of space flight is subject to some qualifications in favor of subjacent states. The present acquiescence of space flights was rather given because of the IGY and the scientific nature of space flights.

121. There is presently no international agreement which can be used as a base to establish the height of a nation's maximum jurisdiction in space. Because the IGY was established on an informal level, there is little reason to believe that allowing an IGY satellite to orbit over a nation's borders constituted a tacit exception to that nation's absolute sovereignty over its superjacent air space. It is suggested that a nation's superjacent outer space may be used for any reason which is non-military and in the interests of scientific research.
122. The United States, because of its IGY position that all space at and beyond the altitude of satellite operation is "free" space, seems to be precluded from asserting that the territorial limit of its sovereignty extends beyond 300 miles in the atmosphere.
123. The fact that the Brazilian government did not choose to raise the problem of sovereignty when the first satellites were launched does not mean it would sit back and let the situation develop uncontrolled.
124. The only conclusion that can be reached regarding the lack of protest over the announcement by the U.S. and the USSR that each nation would put satellites into orbit around the earth is that all nations have impliedly agreed to such satellites. Such agreement, however, can only be construed as extending for the period of the IGY; after that, the orbiting of satellites might well raise a problem of the violation of national sovereignty.
125. Although some theorists say that the tacit acquiescence of those nations participating in IGY to have satellites orbit over their national boundaries is sufficient to preclude them from complaining about subsequent overflights, both Schacter and ICAO disagree.
126. Although it has been suggested that the participation of the United States and the Soviet Union in the IGY satellite program is evidence of the acquiescence of nations to the present U.S. - USSR satellite program, such a suggestion fails for several reasons: 1) the USSR, when Sputnik I was launched, announced that it was not an IGY satellite; 2) Such a view fails to explain what happens when the IGY is over. Further, such a view fails to tell us anything in particular about the law of space.
127. Those nations which have participated in the IGY, and which have launched artificial satellites which have orbited over the boundaries of other nations have not thereby recognized limited territorial sovereignty over outer space. Those states must be recognized as only tacitly consenting to the intrusion of such satellites in connection with current scientific experiments.

F. Need for

128. International control over outer space is necessary to insure that outer space will be used only for peaceful purposes and that it will be open to all.
129. International agreements should be made early so as to precede space exploration and preclude the danger of interplanetary imperialism.
130. The problems involved in the exploration and development of space are international in character. For this reason the rules which are to govern human activity in space must be developed by international agreement.
131. An international agreement should be drafted providing for the means of international regulation of space instrumentalities.
132. The question of who may use outer space is of primary importance now that the artificial satellite is a reality. An international agreement is needed to determine the use and control of such instrumentalities in space.
133. If one desires to make outer space the property of the community of nations, proper steps should be taken now to make the means to that end, i.e. the development and status of the missile, subject to international law and regulation.
134. Little or no progress can be made in determining the upward limits of territorial sovereignty without international legislation.
135. All the legal discussion about sovereignty, zones and freedom is interesting, but does not represent the views of any government. No common legal principles have been accepted by governments as to space. A truly worldwide international agreement is necessary.
136. Outer space is a judicial vacuum. Agreement as to its status is necessary to preclude the possibility that protests and reprisals will determine to what legal regime space is subject. Furthermore, without present agreement, any activity is permissible in space. And even if a satellite is subject to the laws of the launching state, conflict-of-laws problems will develop between the launching state and other states.
137. Where outer space begins needs to be established by agreement.
138. The exploration and exploitation of space will give rise to a host of legal questions which will need solution.
139. Since a widespread launching of space vehicles will engender practical problems of physical interference between space vehicles and conventional aircraft, it is suggested that governments should give early attention to the problem and that technical studies could usefully be undertaken.

140. There is an urgent need for international agreement on the status of outer space. The best basis for such an agreement is the principle of the freedom of space. Because instrumentalities which fly in space, however, must also pass through present air space governed by the Chicago Convention, there is a danger that there will be a conflict between a convention concerning outer space and the Chicago Convention. The only way to solve this difficulty is to draft the new convention so that it amends the Chicago Convention, thereby creating a common system of rules applying to air space and outer space.
141. Recent weather experiments have proved the feasibility of controlling precipitation. Existing English law provides no limitation on the use of the atmosphere for such experiments, and there is an urgent need for national and international controls over the use of the atmosphere for this purpose.
142. Reasonable is the proposal that agreement be concluded in regard to radio frequencies for satellite signals, thereby eliminating interference and enabling all countries to receive a satellite's transmissions and to know its location.
143. There is an immediate need for a legal code governing the conduct of nations in their exploration and exploitation of outer space. Although this is the consensus of the experts, there is a striking absence of any official action to procure such a code.
144. The exploration and exploitation of space will give rise to a host of troublesome legal questions. Although there is considerable disagreement as to the rules which will govern such space activity, some solution will need to be found in the near future.
145. Theorists are in accord that international legislation and control over space is the only practical solution to the many novel problems raised by conflicting national interests found in space navigation.
146. Rules of law must be developed to control international use of space. At least tentative international recognition of space as free territory is shown by the lack of protest over the recent U.S. and USSR satellites.
147. A meaningful and comprehensive code for the control of outer space should be established without delay. Otherwise, later effort to establish rules will prove difficult. Furthermore, the resolution of problems demands accord primarily between the two major forces, and it may be impossible to strike a bargain with Russia unless done before they can negotiate from a position of established strength.

148. Space law must be developed in order to prevent anarchy in outer space. It is imperative that uniformity be established with regard to navigational aids, radio codes, etc., and the need for a rule of law in outer space is made grave by the military potentialities of space vehicles.
149. An international conference of all states to regulate outer space flight should be convened quickly. Otherwise, outer space law will be developed through custom and such development will be hard to replace by an international regulation which takes account of all the special interests of states and progress of humanity. The suggested regulation: based on liberty of traffic in outer space, but establishing an organization to draft rules for outer space and assure the security of subjacent states.
150. International co-operation is urgently needed to settle the problem of sovereignty over outer space to legalize and facilitate outer space flights. Nations leading in the outer space field should be given greater importance and influence.
151. International recognition of the need for rules to govern human activity in space is demonstrated by the interest shown in space by the ICAO, UNESCO, and many other governmental organizations. The problems of space law should be the subject of immediate international agreement; if they are allowed to stagnate until they are only capable of a political solution, chaos will result.
152. That area in which the air is not sufficiently dense to provide atmospheric lift, but is dense enough to affect the operation of a rocket or satellite should be the subject of an international convention which would determine its sovereignty status.

G. Priority among issues

153. The problems concerning the regulation of launching satellites, the traffic of objects in space and liability arising from possible collision should be dealt with promptly. The legal status of outer space, sovereignty and similar problems will arise in the long run, but are not of an urgent character.
154. The first step necessary for the regulation of upper space is to determine where upper space begins.
155. Certain non-controversial items suggest themselves for regulation at the present: adoption of satellite flight schedule, prior regulation and determination of specific orbits and radio frequencies.
156. Only those problems arising from the exploitation and exploration of space which will present presently serious questions of international law should be considered at this time. Purely speculative questions should be left for consideration at the time at which they become a reality.



157. For two reasons the present time is not the time to solve such problems as the height of territorial sovereignty over super-jacent air space, or what a state can and cannot do in space:  
1) The interests of the states involved are not yet sufficiently clarified to weigh the various factors involved and 2) We do not yet know enough about the various technological, economic, and military factors involved to make rational legal rules. Although there is some doubt as whether the more presently practical problems can be solved, such as flight rules, allocation of radio frequencies, etc., it would seem that these are the problems which should be resolved first.
158. None of the suggestions for analogizing space to either the high seas or air for purposes of finding ready made legal doctrines to apply to the exploration or exploitation of space are practical, primarily because they fail to take into account the military, political, and economic policy factors involved in developing workable rules for outer space. It is probably best to defer at this time the question of national sovereignty in outer space, and to settle instead the more mundane problems of liability, radio frequencies, etc.
159. Much of the confusion surrounding the problem of developing a satisfactory legal code to govern space arises from the emphasis given by theoreticians to the importance of determining jurisdictional boundaries. The only solution is to shift emphasis from the problem of sovereignty to that area in which most nations might be willing to accept an international code of space law--the civil uses of space. By thus concentrating on activities and license to use space it may be possible to avoid the pitfalls which are inevitably encountered when territorial claims to other vested interest are involved.
160. No international agreement regarding the legal status of space can be satisfactorily reached as long as emphasis on the question of sovereignty is retained. An international solution to the question of the civil uses of space, however, might be satisfactorily reached, and international emphasis should be placed on this problem.
161. The most urgent problems are the status of outer space and the narrower question of the status of the means of transportation and communication in outer space. Other questions, e.g. jurisdiction over events in space craft, contamination of celestial bodies and their status are at best premature.
162. Some legal problems, being more urgent and more ripe for positive international agreement, are susceptible to priority treatment. Such are questions as to the freedom of outer space; liability for injury and damage caused by space vehicles; allocation of radio frequencies; avoidance of interference between space vehicles and aircraft; identification, registration and coordination of launching, and re-entry problems may be prior, i.e. urgent and ripe for international agreement. Determining the boundary between air and outer space, on the other hand, is neither urgent nor ripe for agreement.

163. Although it is probably true that presently practical problems, such as the allocation of radio frequencies, should be the first legal problems settled with regard to space, it is possible that the overriding interests of states today, such as security, may prevent them from agreeing even on such practical rules, because such practical rules might employ or be a step toward rules on more basic issues.
164. Jurists should be more concerned with creating a legal basis and rules and conventions for the internationalization of missile research and development, than with the future status of outer space.
165. An urgent legal problem is to clarify the legal status of outer space craft.
166. Although a comprehensive code for outer space is not desirable because of relative lack of knowledge about space facts, limited agreements are desirable by reason of national security and in order to establish reasonable uniformity. In fact, for reasons of urgency, explicit agreements will play a larger role in the development of space law than they have played in maritime or air law. Certain types of agreements seem ripe at present: continuation of IGY, exchange of tracking data, navigation and signal codes, and use of radio frequencies.
167. An authoritative answer to where outer space begins will at the present time require an international agreement, and because of current knowledge and experience such an agreement will be premature. Furthermore, in the absence of express agreement, further experience might lead to international acceptance of precise limits of air sovereignty. Also, one development might be the conclusion of intergovernmental agreements, if necessary, to govern activities sufficiently close to the earth's surface and bearing such special relationship to a particular state as to call for its consent. Such agreements may be based not only on altitude, but the permissibility of a given activity in terms of blight mission, instrumentalism and other functional characteristics of the vehicle or object in question. Hence, the precise limit for air space and outer space does not present a problem worthy of priority consideration, nor will the lack of solution hinder answers to other issues classified by the Committee as susceptible to priority treatment.
169. Conflict between the justified interest of a state in keeping its territory inviolate and the impossibility of using outer space craft only over the territory of one state will have to be solved in favor of those states which are able to participate in outer space flight.

#### H. Scope

170. It is the obligation of lawyers as the draftsmen of laws and regulations to insure that wherever the scientists lead in space, lawyers shall be prepared to direct their physical achievements to

170. (continued)  
the best interests of national and international aspirations and welfare.
171. Lawyers should not impede scientific progress by discussing abstract legal principles; they should establish the new principles which may be necessary to facilitate the tasks of scientists.
172. Since outer space is a judicial vacuum, an international agreement in the status of outer space is urgently needed. As a first step, the agreement should be based on the principle of res communis, but the formula "free use of outer space under international control" should be the ultimate target.
173. The nations of the world would greatly contribute to the rule of law in outer space by announcing their adherence to the twin principles of freedom of outer space for non-exclusive peaceful purposes and the prohibition of military uses.
174. The vexed question of the legal "status" of outer space will be discarded for the practical purposes when negotiations on the use of outer space reach a point of concrete agreement: probably, a general principle of the freedom of outer space for peaceful purposes will be honored, although states will continue to claim exclusive control of air space.
175. There may be drawbacks of formulating space legislation now since it might impede progress in space travel. Arbitrary limits of distances in space are useless unless coupled with effective control consistent with national security.
176. The United States should promote an international agreement barring the use of outer space for any military purpose.
177. A new convention, analogous to the Chicago Convention, should be drafted dealing with the exploration of space by space instrumentalities. Such a convention should contain provisions providing for: international notification of launchings; exchange of information; indemnification for damage; and the control of radio and safety controls.

#### I. Timing

178. Although the rules regulating the utilization of outer space and the method of their framing--by convention, series of agreements or by international authority of law making and supervising functions--require answers in practice first and more scientific and practical data, the answers ought to be found before individual states have been driven by actual events to improvise their own individual answers. Experience in Antarctica suggests how difficult it may become to consider outer space impartially and universally if a decision is postponed until states have established themselves permanently in outer space.

179. Agreement on the use of outer space is a matter of urgency, since otherwise unwritten rules may become established which would be hard to change. A series of agreements between East and West may be readily reached on frequencies, call signs and signal strength, return of fallen objects, and fuller exchange of data obtained by space vehicles.
180. Legal regulation of outer space should proceed slowly so that principles would not change as scientific advances grow in number.
181. Information on the nature of outer space and an idea of the practical problems that man's entry into space will create are prerequisites to definitive legal rules for outer space. As this knowledge is acquired, the law of outer space will develop gradually as actual situations and concrete problems call for legal answers.
182. Although many lawyers are advocating prompt agreement on legal problems of space, it is probable that regulations will not be negotiated until the situation demands them. By and large, they will be instances of necessity triumphing over politics. Safety regulations will follow rather than precede man into space.
183. Although it would be possible for international law to lag behind scientific progress in space exploration and exploitation, this would imply that international jurists do not know the direction in which space exploitation is going. The reverse, however, is the case.
184. More scientific information is necessary before rules regulating outer space may be drafted.
185. The political impact of successful space flight will be global in nature. Because of the difficulty in obtaining objective agreement after an international problem has grown beyond the point of control or easy compromise, international control over space flight and exploration should be sought now.
186. The primary purpose of law is to resolve disputes between human beings. Before we can develop adequate solutions to the problems of conflicting legal claims in space, therefore, we must adequately understand what potential disputes will be raised, and must better know the nature of the technical problems which we are facing. As these questions are resolved, then on the basis of actual experience we can pragmatically resolve such disputes as they arise.
187. Although Katzenbach and Lipson suggest that the absence of any present law of outer space is, for the time being, a healthy condition, other prominent theoreticians, such as Haley and Cooper, are in disagreement with them. Because the development of a space code would conceivably shift technological emphasis from military to civil position Haley's position would seem to be correct.

188. The development of space law should not be deferred until science has reached greater familiarity with outer space. Air law was developed before aircraft travel, and space law should do the same.
189. It would not be wise to attempt to draft a new international convention dealing with space flight until the time that we have the proper scientific knowledge, and until we know the manner and extent to which space flight will be put.
190. According to M. Mellor's address to the 1955 meeting of the French Society of Air Law, it would be a singular error to pre-fabricate the law of outer space.
191. The international acceptance of the proposed plans to place into orbit a satellite which would cross the territorial boundaries of most of the world's nations indicates acquiescence to such a flight. Any attempt to codify international rules governing the flight of such an instrumentality into space would be premature, and might well prejudice the international collaboration which is taking place in the IGY.
192. Although several apparently workable solutions have been offered to the problem of defining the height to which national sovereignty exists, it would be unwise to attempt to formulate a body of rules governing outer space until we are better acquainted with the practical problems which will be faced.
193. A comprehensive, formal code of outer space is neither possible nor desirable at present. The code of outer space will be achieved by a series of agreements gradually arrived at on particular subjects. Some of these agreements may be formal, either bilateral or multilateral. Others may evolve from consensus achieved by repeated instances of mutual toleration. But the details will depend on experience in outer space and on the changing political context.
194. Acquisition of sufficient necessary scientific data in regard to astronautical activity is a prerequisite to the preparation of a meaningful rule of law to govern such activity.
195. Due to the relatively little knowledge about the actual and future uses of outer space and their technical, political and economic significance, a comprehensive code for outer space is neither practicable nor desirable at present. Furthermore, premature codification might prejudice subsequent efforts to develop a law based on a more complete understanding of the problems involved. The need is, however, to take timely, constructive action to make the law of space responsive to the facts of space.

## CELESTIAL BODIES

### A. Claims to

196. Serious problems could arise if states claimed, on one ground or another, exclusive rights over all or part of a celestial body. However, since there is no likelihood of human settlement or exploitation of resources in the near future, the Committee concluded that the problems relating to settlement and exploitation of celestial bodies did not require priority treatment.
197. The principal argument for maintaining the planets as common international territory is the difficulty which would be encountered by a nation attempting to assert governmental control over a celestial body. The argument in favor of territorial sovereignty is founded upon the doctrine in international law of "inchoate title" to land, and rests upon the policy that the right to assert sovereignty would be an incentive to explore and develop the celestial bodies.
198. Title to any natural resources found on celestial bodies should be regarded as vested in the United Nations, and any exploitation of such resources should be on the basis of concessions or licenses.
199. International trusteeship of territory is the best alternative extraterritorial to national ownership to prevent rivalry and military advantages. The discovering state should be compensated for the loss of mineral rights, etc., it would otherwise acquire.
200. Sovereignty over celestial bodies should be considered as vested exclusively in the United Nations.
201. Instead of carrying national rivalries to outer space, it is opportune that the United States adopt the position that it seeks no sovereignty over celestial bodies to the detriment of other nations and will, therefore, join other states in formulating an international regime for celestial bodies, with jurisdiction over these bodies in the United Nations.
202. It is clear that international law at the present time offers no clear rules or precedent for dealing with the problems raised by the question of sovereignty of nations over celestial bodies. It would seem to be unwise to attempt to apply by analogy rules developed with regard to the high seas or for the acquisition of sovereignty over terra nullius; we must be prepared to create new rules more fitted to unique environments and activities. And until human activity on the celestial bodies becomes sufficiently intensive and potentially conflicting as to require legal ordering, decisions on such questions seem to be unnecessary. Sensible solutions cannot now be evolved to future problems whose nature and context cannot be accurately foreseen.

202. (continued)  
Until that time, then, the most sensible position for the U.S. is to adopt a policy akin to the "wait-and-see" policy adopted with regard to the Antarctica. Under such a policy, we would neither assert claims to such bodies nor recognize claims asserted by other nations, but would reserve any rights to which we may be entitled.
203. Celestial bodies should be used for the benefit of all, and should be treated as analogous to Antarctica.
204. The disposition to apply the law of occupation on earth to celestial bodies exalts the letter of the law above the spirit. The details of the application of the occupation doctrine always varied with relevant circumstances of technology, possibilities of effective occupation, difficulties of proof and the objectives of the participants. The policies behind the traditional doctrines aim to reward priority in time, acknowledge effectiveness of control, maintain peaceful activity and public order, and encourage development of resources. The history of allocation of resources belies the supposition the celestial bodies may become exclusive property by shooting flags onto their surface.
205. The U.S. position as to the assertion of dominion over the polar and arctic areas should be extended to apply to celestial bodies: the discovery and exploration of free lands is not sufficient to assert sovereignty, unless the discovery is followed by actual settlement.
206. National sovereignty over celestial bodies is unwise. Effective control would be difficult to exercise; geographical limitations would be difficult to ascertain; and international relations would be worsened. They should be treated as the high seas are: not owned by anyone and open to all, but not totally lawless. (Schacter)
207. The problems of ownership of outer space and celestial bodies are so complicated and depend on so many unknowns that they are presently unsolvable.
208. Celestial bodies should not be treated as res nullius, open to any nation to claim. Rather, they should be free to all, just as the open seas are.
209. No basic reasons exist yet with which the dispute between res nullius or communis can be solved. Questions of what is there in outer space; can it be conquered; will outer space be at the mercy of invasion of one or more powers; and are there other developed communities; must first be known.
210. It may be legally argued that celestial bodies should be considered as open for discovery and occupation by the first comer. But this view is politically unacceptable to the modern world, particularly since outer space may make some contribution toward meeting the Malthusian problem.

211. The first claimant or occupier on the stars or the moon should not be able to assert sovereignty over the body occupied.
212. It is desirable to prohibit states from laying territorial claims to planets and obligate that all explorations be made for all nations, on behalf and under the direction of the United Nations.
213. The celestial bodies should not be subject to appropriation by individual states; the basic concept of space as free for use by all should be extended to include the planets as well as open space.
214. Celestial bodies should not be subject to appropriation; freedom of outer space should extend to the planets.
215. There can be no place in space law for the concept of occupation of celestial bodies. The essential requirement for legal occupation--effective occupation--will be absent. Furthermore, occupation as of old carried with it the law of the home country which was adopted to fundamentally similar communities. Since planets bear no resemblance to earthly conditions within which our laws have been framed, there cannot be a transplantation of earth laws to outer space.
216. Since space is not res nullius but is res communis, there can be no claims to the planets on the basis of permanent title and sovereignty.
217. Celestial bodies must be regarded as res communis and not subject to appropriation by any nation.
218. It is unlikely that celestial bodies can be placed under international control so long as the control of such bodies offers military advantages in times of international unrest. Probably traditional notions of discovery will be applied to such bodies.
219. Mineral deposits found on celestial bodies could belong to the discovering and exploiting nation without requiring national sovereignty over the body itself. Rules against waste and destruction should be established. (Schacter)
220. The celestial bodies should be made legally incapable of sovereign ownership by states, and the utilization of them for military purposes outlawed. It is unlikely, however, that an international understanding to this effect will be reached until East-West animosity subsides, for the paramount importance of planetary occupation is presently military.
221. Present rules of discovery and occupation cannot be applied to celestial bodies without increase of risks of war. Such bodies must be under international jurisdiction, and held by all nations - if they are uninhabited.



222. It must be remembered that traditional rules relating to sovereignty and occupation have been derived from basic underlying policy considerations; hence the rules of territorial occupation which exist today have been derived from policies relating primarily to the encouragement of settlement and exploitation. Because the celestial bodies are not fit for either settlement or as a source of raw materials, it would seem that an application of traditional rules of sovereignty and occupation to the celestial bodies would be an instance of an irrational transfer of existing legal concepts without regard to the particular circumstances involved.
223. It is not likely that the moon and planets will be treated as Antarctica is. There is unlikely to be effective occupation, dividing seas, or a Pope Alexander VI to divide up the world for us.
224. International custom will probably be relied upon to settle disputes over claims to the celestial bodies. The court of International Justice has said that such a claim required the "intention and will to act as sovereign, and the exercise of such authority."

B. Exploration & discovery

225. Although international law requires occupation and control as well as discovery of new territory to give the discovering nation a valid claim, these requirements should be relaxed somewhat when the claim is for a distant uninhabited planet.
226. Two basic rules may be postulated for space exploration: in any instance in which there is reason to believe that intelligent life exists on a planet, no landing may be made on that planet unless 1) the landing will not injure its occupants, and 2) there has been an invitation to land.
227. If new riches are discovered on planets, it will be of extensive judicial importance, since economic factors are influential in shaping the law. The influence of new riches on the earthly system of values, prices and economic life will pose an immense task on the legislator, not only in relation between states, but also in private law.

C. Moon

228. Nuclear bombs should not be exploded on the moon until its surface has been analyzed.
229. Because of the lack of a well planned U.S. space exploration program, it is quite likely that the USSR will be the first nation to reach and explore the moon. Upon doing so, it is likely that the USSR will claim sovereignty over the moon on the basis of exploration and discovery; and with the lack of any international body which can effectively enforce international law, they may be able to effectively assert their claim.

230. Whether planets are common property or res nullius requires solution before the first arrival on the moon and the ensuing conflict of national supremacy over that planet.
231. Whoever gets to the moon first can claim it. A valid claim of sovereignty involves: 1) planting a flag on the moon's surface; 2) sending men in a rocket to look at the other side of the moon; 3) landing a small colony on the moon.
232. Possession is not necessary to claim sovereignty over unexplored areas. By virtue of the radar contact with the Moon made by the U.S. in 1946, the United States is entitled to claim sovereignty over that heavenly body. To further follow up radar contacts already made, the U.S. should implant a flag on the surface of the moon via rocket.
233. Dr. Andrew Haley says the principal of discovery would allow the first nation to send a manned rocket to see the other side of the moon would have a good legal claim to whatever is seen.
234. Haley has said that any country could stake a claim to the moon by doing three things: 1. Send a rocket to emplant an emblematic marker on the moon; 2. Send a space ship around the moon to claim the reverse side by discovery and mapping; 3. Set up a colony on the moon. Because of the tactical importance of the moon, Haley would like to see an international convention embodying the principle that the moon is world property executed before any nation makes an attempt to thus claim the moon.
235. The traditional conditions of acquisition of new territory are: 1) discovery; 2) symbolic annexation; 3) occupation sufficient to insure the status of the claimed territory, will probably be applied to the Moon. The inability to colonize will probably not matter, so long as the state has the ability to withstand counterclaims and maintain order.
236. Flag planting will not suffice to give any nation sovereignty to the moon, nor will landing rockets there or even scientific exploration teams do. There must be a long range program of exploitation of natural resources to perfect title. Then the problem must be solved of how much adjacent territory is "geographically related" and may also be claimed.
237. The problem of claiming sovereignty over the moon presents many difficult problems. Discovery, since all can see the moon, certainly is not sufficient. Neither is the hinterland principle, since the moon, with no oceans, has no coast line. And to apply the principle of "effective occupation" would bring about insurmountable problems. The most likely possibility is that each nation which establishes a scientific post on the moon will have jurisdiction over that post, without laying claim to the territory on which the post exists.

- 238. It may be possible to place the moon under international control because of its limited military potential, and without reference to the more complex questions of sovereignty in space.
- 239. The great majority of experts say that to effectively claim the moon, a nation would have to have the ability to defend, occupy, and administer its territory. Because the moon is seen daily by millions of people, merely getting a satellite close enough to take pictures would not constitute discovery. Minority theorists say that possession through placing a man on the moon would give a nation the right to claim possession. Probably the best solution would be to have the moon administered by the U.N. as common world territory.
- 240. A draft declaration regarding the legal nature of the moon, proposed for submission to the United Nations, with comments. The draft is based on 5 principles: 1) The moon is not a territory; 2) it cannot be declared independent; 3) it cannot be declared autonomous; 4) it cannot be declared a sovereign state; and 5) there are no rights of ownership on or over the moon.
- 241. The law of "discovery" would not be applicable to a claim to the moon; the only relevant law pertaining to such a claim would be that provided through the medium of international law-making treaties.

D. Occupation & settlement

- 242. New principles will be needed to solve problems arising from spacecraft landing on the moon and other planets and perhaps setting up permanent establishments there.
- 243. Interplanetary voyages will have a profound effect on private law. Settlement of planets will not only call for new criminal law with new crimes and punishment, but also of a new basis for property law which today is divided between movables and immovables. Similarly, a new psychological law may emerge since life on planets may require mental transformation, with a new basis of what is psychologically "normal."
- 244. The fact that other celestial bodies are basically inhospitable to life is favorable because it means that man's energy will be devoted to conquering survival problems there rather than disputing among himself over who owns it. Men will have to work together in order to survive. In this sense it is analogous to the Antarctic.
- 245. If man colonizes the other planets, such colonies will be highly scientific rather than imperialistic.

E. Other beings

- 246. The problem of the treatment of extramundane communities is at the present too remote to deserve serious international thought.

247. There is no real danger of interplanetary warfare since any races we encounter in space will probably be superhuman or subhuman. If there are superior beings elsewhere, their moral state will probably be as advanced as their scientific state.
248. Nothing but good can come from our contact with superior forms of life elsewhere in space, unless, perhaps, it is too superior and breeds in earth a racial inferiority complex. But this latter caveat is highly doubtful. More likely, Toynbee's theory of challenge and response will generate the greatest stimulus the human race has known since the navigators of the Elizabethan age opened up the world.
249. M. Mellor, in an address before the French Society of Air Law, has taken the position that if other beings exist on planets with conscious phenomena analogous to those on earth, then they may philosophically be termed human, no matter what their shape.
250. If there is life elsewhere in space, it is certainly not of the self-contradictory sort portrayed by Hollywood because such life would have destroyed itself long ago by its own malevolence.
251. If there is any life at all on Mars, it is indicative of the fact that life is not a rare phenomenon in the universe, and that it may exist wherever there are favorable conditions.
252. Other beings on planets cannot be imposed to our law, either in their relations inter-se or with us. A new law to govern interplanetary relations is necessary.
253. Human relationship with other life forms must always be based on a policy of fairness and reason.
254. Metalaw will have as its basic premise "do unto others as they would have you do unto them."
255. Anthropocentric law, which has the golden rule as its maxim, is ethnically and culturally earth centered. Because of the variety of life forms and cultures which may be encountered on other worlds, rules which are based upon our frame of existence will be of little value in governing conduct with other life forms. Hence we must develop the science of metalaw, based upon the concept of absolute equality, and having as its maxim "do unto others as they would have you do unto them."
256. Given the presumption that life does exist elsewhere, the principle of metalaw must be: Do unto others as they would have you do unto them.
257. The possible existence of other intelligent beings in space prohibits the application of traditional notions of international law which are premised upon the notions of enforcement by force.
258. A review of Haley's theory of Metalaw.

CONFLICTS

A. Jurisdiction of events on board

259. All space instrumentalities should bear a specific nationality, and be subject to the laws of that nation in respect to their flight.
260. It seems fairly clear that the laws of the launching country should govern events on board space craft in outer space, just as they do on board ships, and often, airplanes.
261. If a space station is erected under the flag of any specific nation, then that nation should have jurisdiction over all events on board. If the station is privately erected, the rules of international law applicable to unclaimed territory would apply to events on board.
262. Regulation of events on board may be analyzed and administered similarly to events on ships and planes. The competing principle of jurisdiction permits any state substantially affected to assert its competence when the state has effective control over persons and assets. However, the difficulty of transferring to aircraft the pattern of practices developed in regard to ship may suggest complications in adopting either analogy directly for events on spacecraft.
263. During transit of a space craft through "free space" the law of the state should be applied to which the space vehicle belongs. Decisive for the nationality of the space craft should be either the nationality of the owner or the nationality of the majority of the owners of the craft.
264. All persons, property and events on an earth satellite should be subject to the laws of the state who constructed, sponsored, initiated or placed the earth satellite in orbit and hence has a justified claim of sovereignty.
265. Congress may extend the application of its laws to events on board space craft and stations, but American law will be inapplicable otherwise, since it lacks extraterritorial application. The Uniform Military Code of Justice, on the other hand, will apply automatically to military personnel, since the jurisdiction under the Code is personal, without regard to physical location.
266. U.S. statutes and International rules prior to 1958 may be said to be applicable to the flight of balloons, airplanes, helicopters and similar instrumentalities, but may not be applicable to missiles and satellites capable of use above the atmosphere, nor to other types of future space craft. The definition of "space vehicles" in the Aeronautics and Space Act is much broader than its predecessors, however, and may possibly provide the means for the regulation of the entry of missiles and other space vehicles into areas controlled by the U.S.

- 267. There is no alternative but to follow the laws of the launching state in the matter of jurisdiction over a space vehicle, unless the rocket is under the authority of some international organ. But in regard to person-to-person relationship inside a rocket engaged in space travel, although terrestrial law can be applied, it is unreasonable to apply to outer space the law of a specific earthly society or the present concept of international law. Conditions of life in terrestrial atmosphere may differ from existence in celestial space, or on planets. Hence new norms will be necessary.
- 268. The captain of the space vehicle should be treated analogous to a captain at sea, and be invested with the right to administer criminal law with respect to events and people on board the space craft.
- 269. Devices used for cosmic flights belong to the launching state and if they fall in foreign territory they, or their remains, must be returned.

#### CONVENTIONS

##### A. Chicago Convention

- 270. Both Conventions have nothing whatsoever to do with the status of outer space, hence any attempt to declare the international status of outer space from these agreements will only lead to error.
- 272. The term "air space" in the Chicago Convention is atmospheric space. Hence the Convention neither gives a right nor grants the right to extend sovereignty beyond the line where atmosphere ends.
- 273. The limit of sovereignty implied in the Convention is the region in which aerodynamic flight is possible, well below 300 miles.
- 274. The underlying assumption of the Chicago Convention, though not expressed, is that territorial sovereignty extends as far as a state can exercise effective control from its own territory.
- 275. Review of national legislation since the Chicago Convention, concluding that in the course of ten years almost half of the adherents to the Convention revised their basic laws. However, it is impossible to detect any uniformity, the laws being far from uniform either in length or in content.
- 276. Although the Chicago Convention does not define "air space", that term is modified by the term "aircraft" used in the Paris Convention of 1919: "any machine which can derive support in the atmosphere from the reaction of the air." Because the U.S. did not ratify the Paris Convention, however, it is free, if it wishes, to take the position that it is not bound by the definition of aircraft in International Law. On the other hand, it might be wise to accept the Paris Convention definition of "aircraft", and then define "spacecraft" as being mutually exclusive of "aircraft", thus making any vehicle which will come within either of the two definitions subject to the more restrictive of the two possible regimes.

277. The Chicago Convention, in adopting the Paris Convention statement on sovereignty, intended to limit the extent of territorial sovereignty over superjacent air space to those areas in which air vehicles derive support from the atmosphere.
278. There are no settled definitions for the upper reaches of the atmosphere and beyond. Some would make air space (with concomitant legal rights) extend to infinity; the Chicago Convention appears to mean no more than that air space is that area where the atmosphere is sufficiently dense to support balloons and planes.
279. The Chicago Convention promulgated as a rule of international law the doctrine of exclusive air space sovereignty and is a rule which must be characterized as basically municipal in scope.
280. The Chicago Convention contains no definition of the term "air space". As that term, however, was adopted from the Paris Convention, it meant to deal with that region of the atmosphere in which the air is sufficiently dense to support by reaction balloons and airplanes. Any extension of national sovereignty above this region must be on the basis of international agreement.
281. The Chicago Convention limits "aircraft" to those devices which derive their support from the reaction of the air. Missiles and satellites are clearly not within this definition; high altitude balloons present a marginal question of categorization.
282. The Chicago Convention was intended to cover conventional aircraft, and in no way governs the launching or flight of a space vehicle.
283. Since the framework within which the Chicago Convention was drawn was concerned only with problems applicable to conventional aviation, that Convention should have no bearing on the problem of sovereignty over outer space.
284. Outer space travel is not covered by the Chicago Convention, hence no state has the duty to grant free passage through its air space for purposes of outer space flights.
285. The Chicago Convention is largely useless towards solving problems of sovereignty over outer space, and another convention is unlikely to occur. Recourse must be had to traditional international law, which by way of analogy to the high seas, is quite relevant.
286. The Chicago Convention is largely irrelevant in determining the height to which national sovereignty should extend into space.
287. The Chicago Convention does not solve the problem of satellites flying over the air space of national territory.
288. The Chicago Convention was not intended to deal with the problem of flight in outer space.

289. International rules controlling national sovereignty rights developed by the Paris and Chicago Conventions are wholly inadequate to deal with the unique problems presented by the operation of vehicles in space.
290. The Paris and Chicago Conventions speak about atmospheric space, but without indicating the limit of the atmosphere or the altimetric limit of sovereignty.
291. Much of the confusion over the upper limit of territorial sovereignty can be blamed upon the ambiguous use of the word "air space" in the Chicago Convention.
292. The Chicago Convention may never have been intended to regulate anything but conventional civil aviation, and its definition of "aircraft" cannot reasonably be stretched to fit new and at that time unforeseen devices and situations.
293. The wide diversity of views presented at the annual meeting of the society of International Law in 1956 make it clear that the rule of international law stated in the Chicago Convention as to the sovereignty of a state over its superjacent air space cannot be fairly interpreted to extend the sovereignty of the state above its superjacent "air space" into outer space.
294. The term "airspace" is not defined in the Chicago Convention, and although the term "aircraft" is defined, it seems unwise to fit this definition mechanically to new and unforeseen devices and situations.
295. Several questions pertaining to the applicability of the Chicago Convention to the legal status of "outer space" call for immediate resolution: 1) By regionizing exclusive territorial sovereignty over "air space", does Article 1 of the Convention imply that "outer space" is free to all? 2) What meaning, in the light of space vehicles, should be given to the following terms appearing within the convention: a) "state aircraft" b) "aircraft" c) "aircraft capable of being flown without a pilot"?; 3) Should ICAO be given the power to promulgate rules in regard to the flight of Civil Aircraft at any height?
296. We should not attach importance to the attempts made by various theorists to resolve the problem of the extent of territorial sovereignty over superjacent airspace by reference to the Chicago or other International Conventions. Interpretations of the Chicago Convention and other analogies do not necessarily reflect the actual relations of interest and power among states in the particular matter of jurisdiction over superjacent outer space.
297. The doctrine of exclusive air space sovereignty adopted by the signatories to the Chicago Convention, in the light of usage and understanding, can refer to but one thing--state sovereignty extends to the limit of the earth's atmosphere regardless of whether or not the air space is utilized by the subjacent state.



298. The Chicago Convention is mute on the question of sovereignty beyond atmospheric space.
299. The definition of aircraft in Articles 6, 7, 13 of the Chicago Convention could be extended to new needs of aerial circulation thus assuring, through international legislation, the peaceful exploitation of cosmic space.
300. Article 1 of the Chicago Convention has been surpassed by the development of rockets and is in need of revision so as to correspond to aerial progress.
301. The Chicago Convention might need modification now that international practice seems to permit the free use of outer space.
302. The 8th Article of the Chicago Convention, prohibiting the flight of a pilotless vehicle over the territory of another nation, is clearly aimed at guided missiles, pilotless planes, and earth satellites, and therefore would render illegal the flights of the American and Russian satellites had any other country protested their passage over their territory.
303. Since the launching of a satellite or rocket requires an initial flight of the instrumentality through territorial air space, space flight to an extent will be governed by the Chicago Convention. Many other provisions of the Chicago Convention may be utilized by analogy, as for example those dealing with hazards to air navigation.
304. Neither the Paris nor the Chicago Convention accepted air space as a physical or metrological limitation on sovereignty. On the contrary, these Conventions established no limitation on sovereignty.
305. The Paris and Chicago Conventions exclude any limit in the height of territorial sovereignty, and the Conventions mean indefinite sovereignty. They incorporate the maxim cujus est.
306. There is nothing in the Chicago Convention to indicate that "air space" is limited to that area of atmosphere sufficient to support "aircraft."
307. State sovereignty extends to outer space and is not limited to atmospheric space. Neither the Paris nor Chicago Conventions are limited to atmospheric zones, since the drafters of the Conventions understood the term air space as covering space ad infinitum.
308. In theory, the Chicago Convention extends state sovereignty indefinitely, i.e. to infinity, but no state can reasonably claim such extension in practice. Hence the Convention should be modified to some boundary between 300 and 600 miles.

B. Paris Convention

309. Neither the Chicago nor the Paris Convention extends sovereignty to infinity since their framers did not contemplate anything other than airspace, i.e. atmospheric space.

310. The Paris and the Chicago Conventions deal only with air space, not outer space.
311. Sovereignty in the Paris Convention cannot be construed as extending upward without limit. The meaning of "air" and "air space" in the Convention means gaseous substance providing for aerodynamic lift. Furthermore, Article 1 of the Convention was no more than a declaration of then existing law, and then no customary law existed as to the use of areas above air space - an area characterized by a "column of air."

Furthermore, although nothing in the Paris Convention limited the territorial sovereignty to technical ability to control the upper areas of air space, and though improved aircraft increased the area of "air space", the Convention did not mean that any usable space is subject to sovereignty. The limitation is that of aerodynamic lift.

The Chicago Convention, like the Paris Convention, was a restatement of existing law - similar to that of the Paris Convention. At the same time, there is nothing in the Chicago Convention to limit claims to additional sovereignty, nor did the Convention deal, directly or indirectly, with areas of space not then used.

312. According to the Paris Convention of 1919, the Ibero-American Convention of 1926 and the Pan-American Convention of 1928 the sovereignty of a state extends to the air space above its territories. Hence space craft in transit through such air space are subject to the particular state's sovereignty. However extension of sovereignty above the air space cannot be justified by implication.

#### INTERNATIONAL LAW

##### A. Application by analogy

##### a. air law

313. Air law should be applied to outer space vehicles in transit through air space.
314. The problem of overflight and the connecting issues of nuisance and trespass arising in connection with outer space vehicles should be solved analogous to the respective regulations contained in existing air law.
315. Application by way of analogy of the rules of air law to space vehicles on their ascent and descent within air space is desirable. Thus national aviation laws, bilateral treaties, Article 8 of the Chicago Convention and the Warsaw Convention will apply to space vehicles within the air space. However, any application by way of analogy of air law to outer space is inadmissible owing to the different nature of the two areas.

316. Not all principles of air law can be directly applied to govern legal relationships in outer space. This is especially true of the doctrine of exclusive sovereignty over superjacent air space. Where air law concepts can be rationally transferred to space, however, they should be used to form a nucleus for the subsequent creation of a legal code for outer space.
317. Although principles and procedures developed in relation to the air and sea may furnish fruitful analogies for the solution of problems arising from outer space utilization, specific factual conditions of outer space activities may render many outer space legal problems distinguishable and unique.
318. The general principles of air law are not applicable to the control of human activity in space. Although scholarly discussion of the rules which should govern outer space cannot make law, it is helpful in serving to clarify the problems which will be faced and the possible alternative solutions to those problems.
319. There is no reason why the regulation of air traffic in territorial air space should or must resemble the regulation of other existing types of traffic. In contrast to surface transportation, such as shipping, many unique economic and security factors are found which govern international air controls.
320. Present-day air law is, without doubt, solely confined to the regulation of air vehicles, designed for travel within the atmosphere of the earth, and the resulting problems of such air travel. But some analogies may be drawn for solution of problems such as overflights and eminent domain.
321. Some elements of air law may be applicable to interplanetary flight, such as existing rules governing departure and landing on a state's territory. This is less true, however, of rules governing passage of aircraft through the earth's atmosphere. A more fruitful analogy to apply to space craft, whether in flight or in orbit, would be to maritime law governing ships on the high seas. However, maritime law would seem to be inapplicable to "stationary" satellites, i.e., those orbiting identically with the earth and hence located permanently over one nation.
322. All points of similarity between the changes of air and outer space do not afford sufficient ground for applying the law of the air to outer space. Such an analogy will extend sovereignty and would mean, practically, that the entire program of scientific space exploration could be thwarted by the protests of a single country over which a satellite might fly.
323. Laws regulating air travel and air transport cannot be taken over for the regulation of interplanetary flight, nor can such laws be created analogous to existing air laws.

324. Any aircraft designed for interplanetary flight even though traversing through air, will be subject to outer space law from the moment of the inception of its flight. Air law will not apply.
  325. Air law is the totality of juridical rules--on sea, air, land, in private and international law--applicable to aerial navigation between different points on the surface of the earth. And, by agreement the domain of air law is limited to atmospheric space. Therefore, by definition air law does not apply to interplanetary navigation.
  326. Physical-technical differences between air flight and outer space flight and differences in their respective economic value and consequence make it impossible to take over existing air laws as norms for outer space flights.
  327. Air law should not extend to outer space since the basic problem - sovereignty - may arise in a profoundly different way for conventional aviation than for travel through space.
  328. Unlimited right of air traffic, i.e. the right that any aircraft of any state can fly across any other state or invade the air space of any other state in order to land, is not given by any international law, nor by any convention concerned with the regulation of air traffic, neither can it be based upon analogous maritime law.
  329. The analogy between maritime law and air law, first recognized and utilized by Fauchille, seems to be of little use in developing a body of laws to govern space flight in the absence of commercial exploitation of space.
  330. To analogize air law to space is not possible. Air law is based on the assumption that the vehicle in the air is subject to the will of the individuals controlling and guiding it, and that human will and action changes existing legal relationships. Outer space law will have to deal with aircraft guided from the earth, where the human beings controlling the vehicle in space are incapable of changing the course of direction or otherwise make their will decisively felt. Hence, such legal concepts as negligence, liability and malice aforethought will not be appropriate.
- b. in general
331. Judicial theories based on false analogies derived from a geocentric concept of the universe are inaccurate and anachronistic.
  332. Analogies drawn from existing fields of law will only be useful to the extent that they further the primary objectives to be sought from the development of space law.

333. By its object and nature, outer space law is a new and distinct discipline, in which general and particular principles of international law cannot be automatically comprehended, although some analogies may prove helpful.
334. One of the most treacherous tendencies in legal reasoning is to draw generalizations from seemingly analogous, but essentially very different situations. Since the problems which will be encountered in the development of space will be essentially quite different than those faced in the development of surface transportation, lawyers must be careful not to develop rules which have no meaning when applied to extra terrestrial events.
335. Outer space travel and outer space vehicles are of such a different kind than existing modes of travel and vehicles that no existing law can be applied in a "general analogy." We are thus forced to solve the questions concerned with outer space law independent of existing air or maritime law and only a "special analogy" for narrowly defined questions and problems will be possible.
336. Two factors make it possible to draw an analogy between radio law and space law: 1) both involve the element of great speed; and 2) both contain the element of lack of control over the instrumentality. Like radio law, those involved in the formulation of the rules of space law should think in terms of the potential uses of space.

c. attributes of

337. Although the application by analogy of legal concepts to space may at times result in the transfer of concepts without regard for the varied circumstances, analogous reasoning in the field of space law has one major advantage: by relating new questions to authoritative past experiences, it makes it easier to achieve international acceptance of the principles to be desired. Thus traditional legal conceptions may play important roles even in fields where conditions, techniques and aims may be different. The analogies selected for application, however, should be rationally selected for each individual application.
338. For the regulation of interplanetary flights new laws will have to be created. The nature of astronautical, as compared to aeronautical, flight will prevent the taking over of existing air laws, national or international.

d. maritime law

339. The close parallel between the seas and space leads one to the inevitable conclusion that maritime law will provide the basic doctrines for the development of space law.
340. Western lawyers generally agree that the law on the high seas can be applied to outer space.

341. Analogous to maritime law, the passage of interplanetary vehicles through the air should be free.
342. The problem of trespass by spacecraft during re-entry into the earth's atmosphere should be solved by analogy to the law of innocent passage through territorial waters in maritime law.
343. The present state of scientific knowledge is not adequate to allow legal theorizing as to territorial sovereignty and jurisdiction over space vehicles. To establish tentative lines along which space law will in all probability develop, however, we may turn to the law of the sea, and draw parallels from the rules of international law which apply there.
344. The Chicago Convention is largely useless towards solving problems of sovereignty over outer space and another convention is unlikely to occur. Recourse must be had to traditional international law, which by way of analogy to the high seas, is quite relevant.
345. As some rules of the law of the sea were not appropriate to air law, so too adoption of provisions of the sea and air law will depend on the applicability of the purpose of each rule to the needs of outer space.
346. The analogy to outer space of the high seas may be attractive in terms of research activities, but what about military and economic activities?
347. Recognition of sovereignty over air space does not negate the freedom of international air traffic. Analogous to maritime law and the laws regulating international land traffic, freedom of air traffic is granted and guaranteed by international conventions.
348. The aircraft is sui generis, and for general jurisdictional purposes maritime law provides no helpful analogies.
349. Outer space regulations should be different from those relating to the high seas and air space.
350. The question of whether an exact limit should be placed on extending national sovereignty, and by reference to what principle cannot be settled by analogy to maritime law.
351. No analogy may be drawn between outer space and the open seas since there are essential differences between the two: an accident on the high seas, no matter how disastrous, does not directly endanger people on land whereas the crash of a space ship might cause disastrous consequences to people on earth.
352. The proposals to divide outer space into status zones with different legal regimes is a crude analogy to high seas and territorial waters, an analogy which is not only inappropriate but wholly irrelevant to the problem of assuring peaceful use of outer space.

353. One scientific proposition must be crystal clear in the minds of the lawyer and statesman, namely, that the legal problems involved in space travel and exploration are unlike and are different in kind from those involved in maritime navigation and in air navigation, and only very limited analogies may be derived from the corpus of maritime law and air law.
354. The sovereign claim of a state to the air space above its territory is based upon the fact that each state has to be regarded as three dimensional and hence the air space is an integral and necessary part of the territory of each state. The analogy to the open sea does not hold true, since every state can exist without the sea, but none without the air.
355. The air-sea analogy advanced by those advocating freedom of the air is fallacious. Control of the sea is not essential to the existence of a nation, but control of the state's superjacent air space is.
356. Security reasons alone make the spatial analogy of space to the high seas inappropriate and largely irrelevant to the problem of developing a workable limit to territorial sovereignty over superjacent space.
357. We must realize that the problems involved in the exploration and exploitation of outer space are completely different than those which are faced in maritime or air navigation, and that the uniqueness of space calls for a completely new body of rules designed to meet the unique problems which will be found.
358. There are many difficulties in applying the law of the sea to outer space. The sea only borders land while space covers it. Further, there is a diversity of zones in the sea with varying jurisdictions which are causally rather than spatially determined.
359. Because of the insecurity raised by space ships freely weaving above with complete freedom, outer space cannot be analogized to the high seas. Outer space, though free, must be used under international control and only for peaceful purposes.
360. Outer space should be treated like the high seas: no state should have sovereignty over it. International law should govern, as it does at sea. Spaceships should have a nationality and be under the control of that state just as marine ships are. Many more details of admiralty law are applicable. However, space may be outlawed as a theatre of war because of the great danger, whereas the seas have always been open to military operations.
361. Analogizing space to the oceans fails to take into account the dominant policy factors in developing a code of legal rules for space -- primarily political, military and economic factors. Further, since outer space has no readily definable boundaries or subdivisions, many legal doctrines applicable to the high seas may not even be capable of being observed or enforced in space.

362. The idea that space should be governed by the same legal regime that governs the high seas is fallacious. This is because the greater distance a vessel is from adjacent land, the less danger there is to the adjacent land from aggression by the vessel. This is not true of space, however; the protection of the subjacent state from an overflying space craft does not increase with the height of the craft.
363. Regulations concerning time necessary for death declarations for outer space travellers and regulations concerning the collection of insurance will be modelled upon those applicable to maritime law.

e. polar regions

364. There are significant differences between space and Antarctica which cast doubt on the validity of any analogy between them: (1) outer space is not defined; Antarctica is a clearly defined continent; occupation and political control are feasible for Antarctica, but not for outer space; (2) 12 nations have conducted activities in Antarctica, only 2 have done anything at all in outer space and none have staked any claims there.
365. Outer space should not be analogized to Antarctica since the two are qualitatively different. Antarctica is a section of the earth's surface while outer space is a boundless expanse. Furthermore, no more than about ten countries have shown interest in the future of Antarctica, while the international status of outer space is of interest to every nation on earth.

B. General principles of law

366. The Roman maxim of Cujus Est Solum was not intended to apply to the upper air.
367. It cannot be said that international law has yet determined the exact limit to be placed on the upward extension of sovereignty, or by reference to what principle.
368. Outer space law is that law which governs astronomical activities both on earth and in space.
369. The contractual right of "freedom of innocent passage" should be embodied as a norm of international law, subject only to regulations and limitations concerning the exercise of this right. As of now this right is in the nature of a "privilege" granted only to contracting states on a reciprocal basis.
370. Although the telecommunication conventions only recognize sovereignty in each state to regulate its own telecommunication, and freedom of the other is implicitly recognized in these agreements, it is not possible to affirm the existence of customary law of freedom of the other. The transit of sound or electrical waves is often affected by prohibitions of non-contracting states and signatories have reserved their freedom of action.



371. The "freedom of innocent passage" as far as it exists is recognized as a contractual right based upon international agreements, granting certain "privileges" to the contracting states.
372. The satellite launched by the USSR was not in contravention of any existing rule of international law. By failing to register any complaint upon the announcement of the proposed flight, the overflown states have tacitly consented to the program.
373. Private individuals are not subject to international law and are not capable of committing an internationally unlawful act. As such, they cannot violate the sovereignty of a state by overflying its territorial borders, regardless of the purpose of such a flight.
374. The mutual interests of science and law make their development interdependent; as science opens new areas, and does away with previous physical boundaries which delimited legal jurisdiction, international law must develop to fill the gap thus created.
375. Where a satellite is not controlled after launching it is possible to consider it as res derelicta. Hence a non-guided missile is res nullius, and is analogous to a ship abandoned to the elements or to a bottle on the seas, and the fate or recovery will depend on the internal law of the recovering state. This does not, however, apply to guided satellites.
376. Laws may be divided into those defining relationships between persons and those applying to the relationship of persons to things. The first group of rules remain valid even in outer space, e.g. responsibility for damage caused to another state or to its citizens, or non-interference with the right of others to use outer space. However, the rules which govern the relationship of persons to things, like sovereignty and occupation, are particular to life on earth and it is absurd to apply them to outer space, if not entirely impossible.
377. A tongue in cheek examination of the problems of copyright law which will be raised by interplanetary travel; whether authors on the moon can copyright their works as though they were on American territory; whether Martians & Venusians need be employed by the Copyright office under its nondiscriminatory policy, and whether duration of copyright protection should be extended beyond 28 years since it will take more than that time for many works from other stars to arrive on earth.
378. A fantasy set several decades in the future, and suggesting that 1) traditional conflict-of-law rules should apply in a dispute with an extragalactic legal system; 2) rules covering collisions in outer space should be derived from general maritime law; and 3) to avoid possible legal complications the orbit of a U.S. satellite should be planned to miss space over the USSR and Nicaragua.

C. International Court of Justice

- 379. Disputes between governments over conflicting claims arising from interplanetary exploration should be resolved by arbitration and submission to the International Court of Justice.
- 380. Modern international law is equipped to handle disputes between states as to space operations. There are treaties, arbitration, The International Court of Justice and the Security Council.
- 381. Disputes between nations as to problems of space can go to the International Court of Justice for settlement according to stipulated laws or according to customary international law, which is applicable. (Schacter)
- 382. Disputes arising between governments over the operation of space craft owned by an international agency should be resolved by submission to the International Court of Justice. That court should apply such rules as have been agreed upon by the contesting governments, and lacking such agreement, by the application of international custom.
- 383. The provisions of the United Nations Charter and of the statutes of the International Court of Justice are not limited by their operation to the earth.

D. Not applicable to space

- 384. Natural law, not present positive international law is the correct basis for unrestricted space travel.
- 385. The initiation of outer space exploration has in fact broken down some of the classical principles of international law regarding the sovereignty of states over space above their territories.
- 386. The appearance of the earth satellites reveals that private international law is inapt for the future problems of space travel. New legal attitudes and approaches are needed.
- 387. Law serves to regulate the relationships of individuals of a community. Any fundamental change affecting the individuals of the community must lead to a change in their legal norms. Such change is given by the exploration and use of outer space and hence should lead to appropriate legislation.
- 388. To sustain human beings in their struggle with the infinite and cosmic age, the law should combine psychological and sociological objectives--the creation of homo-juridicus. The homo-juridicus not only lives by his word, but also resists the regimentation which the atomic age foreshadows, and is psychologically fit to explore and legislate for the cosmos.

389. International law provides no norm with respect to cosmic space. But the absence of definitive norms does not mean that there is an absence of general norms, as the non use of force or threat of force, although the prohibition of military use of outer space is connected to disarmament, particularly to the question of military bases.
390. Existing provisions of international law do not envisage anything which would constitute a generally acceptable international norm on the use of outer space.
391. Andrew J. Haley is preparing a comprehensive codification of space law. Rather than basing space law on existing international law, Haley will go back to the promulgators of natural law.
392. Conventional earth bound laws are anthropocentric, and for this reason, are only just and workable when the disputants have earth bound characteristics. A code of space, therefore, to be workable with extra territorial intelligences, must be based on natural law, or the law of natural reason.
393. Natural law, rather than existing international law, must provide the basis for a legal regime for outer space. This is because present international law begins with the premise that a state has exclusive sovereignty over its superjacent air space. That premise is hostile to the concept of space travel.
394. The law which will be created in outer space for the voluntary societies of people on the various planets will be similar to present-day international law in that it is a voluntary law based on the consent of free and equal ranking subjects without any effective claim to enforcement by a superior force.
395. International law is positive law, developed through compromise between nations acting in their own self-interest. As such, it is basically municipal in scope. A workable body of space law, however, cannot be premised upon positive law. It must be based upon natural law, and not related to national self-interest. Its emphasis must be on the relation of man to space--not on the relation of the national to his country.
396. It is beyond the power of international law to create norms concerning what part of outer space should be subject to national sovereignty.
397. Outer space law will encompass the totality of juridical norms, regulating the legal relationships between individuals and between individuals and states, insofar as these relationships are created through the use of specially designed machinery traveling outside the earth's gravity. Decisive for the application of outer space law, rather than air law, will be the use or non-use of aircraft specifically designed for interplanetary flight.

398. It is not possible to incorporate into generally recognized rules of international law the interests which a state may legitimately pursue in restricting flights into its superjacent air space.
399. Man's entry into cosmic space has outmoded the old concepts of international law such as the one expressed in the maxim cujus est solum, as well as the principles embodied in the relevant Articles of the Chicago Convention.
400. Jurists and international legal bodies have begun to feel the need of a code of international law to cope with the rapid development of space. If chaos is to be avoided, a completely new set of rules to govern space must be developed. Little help will be found in existing doctrines designed to handle the problems of surface traffic.
401. On the basis of international and national laws sovereignty does not extend to outer space. However, it does not follow that outer space is a juridical vacuum without restrictions on freedom of action. All universally accepted rules of international law, e.g., the non-use of force in solving disputes, non-injury of foreign citizens and their property, government responsibility, prohibition of infringements upon universally recognized rights of any countries - apply to the cosmos. Hence freedom of outer space means the right of each country to use cosmic space as it sees fit without doing harm or causing injury to other states.
402. The methods by which controversies over the use of outer space will be resolved can be expected to resemble those by which the law of the sea has evolved, but with certain important differences. E.g., the time factor may render the "intelligence" function more important in the application of law to outer space, scientists may share a larger role, and the disparity of outer space capabilities may give rise to new groupings of nations asserting their demands.
403. The need to create a law to govern outer space will lead to an amplification of existing general principles of law. The factor of "time" essential for outer space problems has to be absorbed into the legal structure in its mathematical meaning as well as in its historical significance.
404. Interplanetary law signifies a method of investigation which will provoke a revision of fundamental concepts considered hitherto as intangible. The new method of investigation is the application of the time concept to law. The time concept means not only a confirmation of the non-existence of absolute rights, but also that:
1. Time is a decisive factor in the law.
  2. Therefore, in order not to accept rigid and absolute concepts, law, like time, is mutable and variable.

## LEGISLATION

405. An outline of all U.S. legislation concerning space which has been adopted and/or proposed.
406. The National Aeronautics and Space Act of 1958 charges the National Aeronautics and Space Administration with the responsibility of research into and the solution of problems of flight within and outside the earth's atmosphere. Such research is not limited to questions of pure and applied science.
407. The National Aeronautics and Space Act created a new agency of the government formed around the National Advisory Committee for Aeronautics and designated the National Aeronautics and Space Administration. The act is chiefly concerned with research, development, and exploration, and in no way is concerned with such things such as the operation of commercial airlines or the control of air traffic. The act, however, does authorize the agency to undertake research in space law.
408. An elaboration of the details of the National Aeronautics and Space Act of 1958, coupled with the text of the Act.
409. The National Aeronautics and Space Act of 1958 contains a Patent provision vesting title of all patents which bear a relation to the work of the space administration in the government, whether or not such patents were financed or developed for the government. Since the work of the administration is also concerned with military and aeronautical matters, this patent provision would seem to be much broader than necessary, and will undoubtedly have a strong adverse effect on the hiring and retention of competent scientific personnel.
410. The details of the National Aeronautics and Space Act of 1958, by Congressman Teller, who also relates the background of the Act, various conflicting military, administrative and Congressional interests, and a comparison of the House and Senate bills. The article includes an appendix containing the President's Statement on Space Policy, and the text of the National Aeronautics and Space Act.

## LIABILITY

### A. Absolute

411. Owners and drivers of space vehicles will be subject to absolute liability without any ceiling as to the extent toward all persons and things damaged by the space craft in the absence of any contractual relationship. Liability towards passengers should be limited to fault, negligence and contractual breach.
412. Liability for damage caused through space exploration should be fixed by means of an international convention, and the general problem of liability should be settled in terms of activity involved, rather than in terms of airspace-outerspace boundaries. A rule of absolute liability will probably be preferred, in view of the difficulties of fixing fault.

413. All outer space craft should be obliged to observe the universal duty of due care which is obligatory for all those handling, controlling, owning etc. "dangerous instrumentalities".
414. Even though existing air laws will not govern outer space travel, space travelers as well as those responsible for the interplanetary flight are subject to the universal obligation imposed upon those using "dangerous instruments," the use of which might damage or endanger the public.
415. All damage done by rocket shells, boosters etc. being incidental to outer space flight must be borne by the owners, pilots etc. of outer space craft.
416. States should be liable for damage caused by their spacecraft occurring anywhere below 500 miles above the territory of another state. Since private individuals cannot sue other states, the state of the injured individual should enforce his claim against the culpable state.
417. Launching under preserve condition being solely under governmental auspices, full responsibility for damage lies with the government concerned for personal and property losses of citizens of foreign countries.
418. Because a satellite's flight is analogous to that of a meteor in not being subject to human control, its fall should, like the uncontrolled fall of a meteor, be considered as an act of God. The launching nation, therefore, would have no liability for re-entry damage.

B. General principles

419. The problem of liability for injury is compounded by the divergent systems of jurisprudence. Under the Napoleonic Code, which exerted a strong influence on germanic and Latin American jurisprudence, liability without fault is not looked on favorably, while in the United States the contrary prevails.
420. When space travel becomes operational, the risks involved will become reasonably constant and insurance companies will be able to cover them. (Then follows a list of what factors are relevant to such insured risks.)
421. Studies should be encouraged to specify the types of risks, the gravity of the danger and the technical possibility - as well as cost - of preventive measures. These studies could be undertaken with a view to the possible formulation of appropriate international standards.
422. Disputes between states over liability for injury and damage caused by space vehicles should be submitted to the International Court of Justice, and a suggestion is made for an agreement on compulsory jurisdiction over these matters.

C. Limits

423. The extent of the liability imposed upon the outer space, traveller, driver and owner should be limited analogous to the limitations set in air law.
424. If a space vehicle is to be attached for outstanding debts incurred for its construction and/or flight, and the attachment proceeds after a successful flight, certain rights of the originator of the flight, especially patent and author rights, should be exempted and specially protected.
425. It is premature to attempt to clarify in detail modes of redress for harm inflicted by space activities and whether a rule of absolute liability is preferable to fault liability; whether there is a place for public, private or mixed insurance schemes; whether an international fund may be set up, or international agreement reached on limits of liability, should abide further experience. The nearest relevant analogy may be the problems now posed by the use of atomic machinery and nuclear material.
426. Liability for injury or damage from space vehicles poses the questions of the kind of injury for which recovery may be had, should liability be without fault for some or all activities or be based upon culpability, and should liability be limited. Also, if more than one state participates in the launching, should liability be joint or several. Although the 1952 Rome Convention for damage caused by aircraft should be taken into account, inter alia, in any future study of the above problems, the fact that no international standards exist for safety for space vehicles should be taken into account.

D. Negligence

427. Damage done by outer space craft to people and property on earth should be treated analogous to similar damage done by air craft.
428. The question of liability for damage done by a space instrumentality should be seriously considered, and a determination made as to whether or not liability will be imposed with or without fault.
429. Whether the outer space traveller has observed the specific requirements of due care in the take-off procedure and hence is not subject to any charge of negligence for resulting damage, will be decided according to norms which will be developed for outer space travel.
430. The outer space traveller/driver is subject to and bound by police and customs regulations but in the absence of any special regulation solely concerned with space craft, he is subject only to the general duty of due care and is not subject to air laws and regulations.

431. Although making a nation absolutely liable for any damage caused by a space craft registered in its name would be a realistic policy, two factors argue against its adoption: 1.) The odds are overwhelmingly against any part of a space craft reaching the ground without being disintegrated, thus making the chance of damage extremely small; 2.) There may be no way in which the launching nation can confine the fall of the craft to its own territory, thus making it impossible to find any negligence on the nations part. Probably, the owner nation will make an ex gratia payment.

## MILITARY

### A. Advantage of space

432. The United States should be the first to launch a space station because of the military advantages which will accrue.
433. A space station could be a powerful threat to any nation because of the ease with which it could bomb and the relative invulnerability it possesses. It thus can serve as an effective deterrent to war if in the hands of the U.N. or a peace-loving nation (Von Brauhn)
434. The author emphasizes the great military future of space rockets. He believes that the air force in a conventional sense will soon be outdated and that missiles, flying through outer space will take over because of a) greater speed and b) near invulnerability from anti-missiles.
435. Earth satellites have great military potentials: 1) observation of targets; 2) jamming radar defenses; 3) physiological warfare because radio signals from satellites can only with difficulty be jammed; 4) launching missiles from such a space station at earth targets.
436. The classic dicta of McKinder and Spykman that he who rules the heartland of Europe rules the World are essentially earth-bound, and no longer adequate in the era of space. Rather, he who controls space rules not only the world but the universe.
437. It is unlikely that either the U.S. or the USSR can achieve military control of space since one nation can shoot down what the other sends up.
438. The U.S. has developed a policy of making the exploration of space wholly subordinate to military purposes when it should treat space as the fulfillment of man's hopes and the solution to many of its problems.

### B. Disarmament

439. The use of outer space for peaceful purposes only is but one aspect of disarmament and agreement is difficult, lying in the future.



440. Disarmament in space will be difficult if not impossible once an arms race has begun. Space should be "neutralized" before this happens.
441. The U.S. department of state specifically endorses the disarmament proposal of 1957 now before the U.N. as a significant first step towards regulating the use of outer space for military purposes.
442. Prohibition of the use of outer space for military purposes must be compensated by elimination of foreign bases, since otherwise Russia will be giving up its superiority in intercontinental missiles while the United States is free to use intermediate range missiles and conventional bombers from foreign bases.
443. Demilitarization of outer space must proceed simultaneously with the abolition of foreign bases. Otherwise the lead of the USSR in intercontinental missiles will be eliminated without corresponding security to the USSR of attack by intermediate range missiles and conventional planes based on foreign territory. Furthermore, a one sided agreement is a violation of the principle of equal and mutual benefit, a principle basic to international law.
444. The most effective steps toward developing a code for the control of space have come through the pattern of disarmament. Disarmament, though, seems to be a temporary thing; the basic U.S. position vacillating from administration to administration. For this reason, it seems doubtful that we can depend on disarmament as a permanent solution to the space problem.
445. The general problem of ballistic missiles should be considered as part of the disarmament problem, and not related to the various proposals for the regulation of space activities. Merely because the scientific information which is obtained from space vehicle and satellite exploration of space is useable in a military context does not mean that such scientific research need be eliminated. A state, however, should be allowed to take retaliatory measures if the space activity is clearly inimical to the military security of the state; as through the interference through the means of a satellite with a radar warning system.
446. Post World War II disarmament negotiations between the U.S. and the USSR have broken down primarily over the question of methods of weapons control. It must be realized, however, that no method of weapons control can be 100% safe; that fact, though, should not deter the major powers from continuing negotiations for some method of control which will reduce the perils below the catastrophic level. Because the Soviets' refusals of existing proposals rest on its unwillingness to allow hordes of inspectors to roam throughout the USSR, the emphasis should be placed on automatic monitoring posts to record missile flights, atomic explosions, the production of nuclear fuel, and aerial inspection.

447. Disarmament in the field of outer space vehicles can take various forms, from minimal to maximal:

1. Satellite bookkeeping with constraints on the type, number and orbits of satellites launched,
2. Prohibition of all operational listing and use of military missiles that were explicitly or overtly designed as such
3. An agreement to place all operational listing and use of rockets in the hands of an international agency
4. Same as (three), but with additional constraint that the agency could use only rockets fully developed at the time of the agreement with no further developmental listing permitted.

Each type of agreement will determine the needed scope of inspection and detection. But technically, detection is possible at the cost of \$10,000,000 per station, with the number of stations on the altitude detected (20 miles altitude detection requires 100 stations, with additional 100 stations for every 20 miles increase in altitude). Similarly, test missiles detection can be detected by infra-red if beamed above clouded level, and may be carried by planes over the high seas instead of floating radar stations.

C. Prohibition of

448. States should come to an agreement prohibiting the use of outer space in any future war.
449. An international agreement regulating outer space must include prohibitions against the use of outer space for wartime purposes. Outer space must be used only for peaceful aims.
450. Agreement may be reached to abstain from launching satellites with nuclear or other explosive warheads, but such an agreement would depend on effective pre-launching inspection.
451. The United States should promote an international agreement barring the use of outer space for any military purposes. See also: Agreement.
452. The analogy of space to the high seas breaks down for military purposes and space should not be allowed to become a theater of war.
453. In view of the potential military use of artificial satellites, international law should circumscribe military secrets and thus prohibit astronautical secrets.
454. If space craft are used for military purposes in a conflict between states, present-day military air law must be used and applied to space crafts.
455. Control over outer space must be established before it is occupied rather than after, because in the early stages of satellite development, the military potential of such satellites will be small and nations will be willing to allow international control whereas this becomes much more difficult once the military potential of satellites has been developed and utilized.

## REGISTRATION

### A. Identification

- 456. Artificial satellites should have distinguishing marks, to identify them in case they fall and cause damage.
- 457. Suggests that each state about to launch a satellite register its intent with an international agency, filing a flight plan and description of particulars: load, weight, size. Although this suggestion could be implemented without any formal agreement, it may depend on reciprocal measures by other launching states.
- 458. Satellite flight plans should be filed with a specially constituted international organization before launching.
- 459. The problem of satellite identification would be facilitated by a system of registration of the launchings of space vehicles, their call signs, and markings and current orbital and transit characteristics. Such registration would also help to avoid overloading of tracking facilities, and would afford a convenient means for notification of launchings to other states.
- 460. Prior notice and coordination of satellite and missile launchings would reduce the danger of mistaken identification. However, such notice must ultimately include reliable information of capabilities and payloads, and enforcement may require inspection prior to launching.
- 461. As the number of space vehicles will increase, so will the necessity of their identification. Such identification could be obtained by agreement on the allocation of individual call signs emitted at stipulated intervals. Also, visual identification, by placing suitable markings on space vehicles, is desirable so that on their return to earth the vehicles may be easily identified.

### B. Regulation

- 462. All space vehicles should be registered under the flag of an individual nation, and subject to the rules and regulations of the flag-state.
- 463. Space craft should bear the flag of a particular country. The space craft would then be subject to the supervision and control of the flag state.
- 464. An international convention is necessary to promulgate rules to insure that all space instrumentalities have a nationality.
- 465. All space vehicles should carry the flag of a particular nation, and be under the direct supervision of that state, which in turn would be subject to regulation by a specialized U.N. agency.

- 466. All spacecraft should carry a national flag because only states can commit unlawful international acts. It is doubtful, however, that the space projects may be carried out by any but states.
- 467. Each space craft should bear the distinct nationality of a specific state, and that state should assume full responsibility for the actions of the space craft. Each space craft should be subject to the discipline and laws of the flag-state, and any craft not so registered should be subject to seizure by any government.
- 468. Because of the size of the task involved, space exploration in the near future will only be undertaken by governments. Until some other body has acquired the necessary resources to finance space flight, the question of nationality and flag-registration of space ships is not important.
- 469. The outer space driver-traveller must either register and make public the proposed route of his flight through air space, or follow the traffic rules made for air traffic while in transit through air space. This requirement is not a legal duty imposed upon the space driver-traveller but part of his general duty of due care.
- 470. Since no space vehicle will be able to evade on-coming airplanes, space travelers will have to make public their take-off and projected route to avoid interfering with, and endangering air traffic.

## SATELLITE

### A. Communications

- 471. Not only may satellites increase the efficiency of radio, television and telephone transmission, but it has been suggested that a coding of letters and their relay through a satellite to a decoding and printing station on another continent is possible. This system would result in one or two day mail delivery anywhere in the world.
- 472. Although the technical problems of establishing orbiting satellite radio relay systems are extremely sophisticated, the majority of the problems in such a system arise below the first 500 miles of altitude. The use of such relay systems will become of increasing importance, especially when manned space flight becomes a reality.

### B. Legal status of

#### a. satellite

- 473. The interdependence between the beneficial use of outer space and other types of activities that may be carried on from satellites mitigates against the "right" of unlimited launching irrespective of the nature of the vehicle's activities.

- 474. The internationalization of satellites would not create a legally sharp defined situation, hence it would only add to the existing difficulties of international law.
- 475. The freedom of outer space gives a legitimate basis for the construction and placing of earth satellites.
- 476. Satellites will not be regarded as res communis. Decisive for their legal status will be the process of their construction, i.e., who sponsored it, etc.
- 477. In order to avoid conflicts arising out of the establishment of satellites, international agreements concerning them should be made.
- 478. If an earth satellite is constructed by a private person, without the protection or sponsorship of a state, such earth satellite should be treated as stateless territory.
- 479. A state owning a satellite should not be forced to open it up for the general use of the world community, but if it decides to do so, no arbitrary discriminations against some states should be made.
- 480. Freedom of outer space will provide the legal basis for the establishment of satellites, as freedom of the sea did for the construction of seadromes. Laws concerning satellites can be modeled upon those dealing with seadromes.
- 481. As long as satellites remain in orbit, there is no violation of international law, but their ascension and decension raise problems if this involves passage through the air space of other countries. Permission must be obtained by the launching state and that state must be responsible for any damage done to other states.
- 482. An earth satellite should be regarded as sui generis and not be treated analogous to other outer space vehicles.

b. space station

- 483. If another nation manages to reach and effectively assert sovereignty over the moon before the U.S., we may be forced to utilize space stations as bases to further space exploration.
- 484. New principles will be needed to solve the problems concerning the legal status and conditions of operation of space stations or landing platforms.
- 485. The military advantages of space stations make it unlikely that their control will ever be placed in the hands of an international organization. The only feasible solution is to allow such edifices to be built and controlled by any state.

486. The freedom of outer space does not require that a state owning an earth satellite make it available as res communis to all nations. But once a state allows other nations to use a satellite no discrimination among nations should be allowed.
487. States should have the right to establish space stations to serve interplanetary navigation, but it is desirable to open them to all, either by an international agreement or by their internationalization.
488. According to Alex Meyer's address before the 1952 Congress on Interplanetary Navigation, space stations are analogous to seadromes--states are free to establish them.

However, the danger of such stations to other nations and the stations' military use should justify the obligation, to be faced by means of an international convention, to acquaint other states with such projects, the states having the right to oppose the plan and bring their differences before an international organ.

489. Space stations ought to be analogous to seadromes under the sovereignty of the building state. However, subject to agreement, it should be open as a shelter to all users of space and as an international spaceport.
490. Artificial bodies created in space should be analogized to seadromes, and should legally be the property of the creating state, but open to all nations for use.
491. An artificial earth satellite would probably be treated as are floating islands today. Although it would be subject to the national sovereignty of the building nation, it is doubtful that a territorial belt of adjacent space (as the three-mile belt of sovereignty over water) could be claimed by the satellite any more than a floating island can claim such a belt.
492. Space stations in outer space are analogous, in their legal problems, to seadromes on the high seas. Therefore their legal status is:

1. Each nation is free to establish space stations in outer atmosphere.
2. The dispute whether seadromes may be constructed for military purposes may spread to outer space stations.
3. The stations are not res communis. If the station is constructed by a government or on its behalf, the platform comes under the exclusive jurisdiction of that state, as an extension of its territorial sovereignty. If, however, the station is built by private persons independently of any country, then such stations, like seadromes, are analogous to privately discovered space stations unoccupied by any country and treated as territory unclaimed by any state.

492. (continued)  
4. Space stations are not automatically available to all, but a state has no right to discriminate arbitrarily against anybody once the controlling state has opened the station to public use.
493. The construction of seadromes raises the question of "freedom of the seas", i.e. whether such construction would violate this international norm or whether only the freedom of the seas can give the legal basis for the construction of these islands.

Freedom of the seas does not oppose the taking and constant use of any part of the sea for purposes which would benefit the community of a nation. Hence the legal norm of freedom of the seas gives the legal basis for the construction of seadromes.

Artificial islands, i.e. seadromes, are principally built as substitutes for land, and hence their legal status should be the same as that of natural islands. But in contrast to natural islands, sovereignty over seadromes should not extend to the air space above them nor to the coastal waters surrounding them.

It should be forbidden to fortify seadromes as military bases, except for the purpose of self-defense.

494. The only legal problem involved in maintaining a space station is preserving adequate forces to protect it. It then becomes a natural monopoly.
495. The Eisenhower "open skies" proposal rejects the traditional doctrine that national security is increased by sovereignty over the air space. Rather it supposes that national security is best furthered by all nations knowing - through inspection - that no other nation is planning to attack. International co-operation will provide the best kind of security and also advance international civil air traffic.

#### C. Observation

496. A U.S. proposal that reconnaissance by satellites be permitted by international law would be consistent with our open skies program and would offer advantages to both Russia and the United States. As yet stationary spacecraft are too remote to be a real problem.
497. The U.S. has of yet taken no position on the legality of observation satellites. It is to be expected, however, that in line with the Eisenhower's "open skies" plan, the U.S. will press for the use of such satellites in line with the disarmament plans now pending before the U.N.
498. The question of reconnaissance satellites is particularly pressing because of their potential value for military purposes. A decision on whether to subject such satellites to prior inspection cannot be deferred for long.

499. According to international law it is permissible to photograph one state from the territory of another, and the law of space should create freedom of photography not only when a satellite is above a "willing" state.
500. Reconnaissance by photo or T.V. equipment, although not act of war, serves as expression of mistrust and ill will. Governments, therefore, have still the right to take measures to avert actions in outer space which are directed against them. Such retaliation need not necessarily be correct or carried out in outer space since otherwise countries not possessing space techniques will be unable to retaliate. Hence reprisals may consist of diplomatic protests and other non-military reprisals, applied on the ground and in the air.

D. Retrieval & return

501. Recovery by the launching state of a satellite downed in foreign territory will depend on the will of the state in whose territory the satellite fell.
502. Once a satellite is launched, it is beyond the control of human beings, and therefore its flight is analogous to the flight of a meteor. Because a meteor is the property of the nation in which it lands, a spent satellite would also be the property of the nation in which it lands, regardless of its point of origin.

E. Trustee

503. It is suggested that a state might offer to launch certain types of satellites on behalf of, or as trustee, for the United Nations. While the launching state would retain responsibility for the launching operation, the United Nations would decide the purpose of the flight, determine the payload, design the instrumentation and finance the construction of the satellite and its contents.

SOVEREIGNTY

A. Air space

a. attributes of

504. Sovereignty over air space is a principle of general international law, accepted even by non-signatories to the Chicago Convention.
505. Sovereignty of a state extends only to the space above its territory filled with air.
506. Non-extension of sovereignty to outer space does not apply to air space, beyond which outer space begins. The concept of sovereignty in air space remains valid as a general principle of international law.



507. Recognition of a state's complete sovereignty over the air space above its territory must be distinguished from the full exercise of such sovereign powers. The exercise of sovereign power is subject to international laws and conventions, granting freedom of air traffic, similar to the right of "innocent" passage in maritime law.
508. Sovereignty over air space above its territories is essential for every state on account of military and political considerations. Also, customs and health regulations demand that the air space above a state be within its control.
509. Air space, for purposes of territorial sovereignty, should be defined as that region which contains enough air to support any aircraft, including balloons.
510. Although the Chicago Convention left the upper limit of territorial sovereignty in doubt, there is almost unanimous accord that such sovereignty should be limited to "air space," as that word is eventually defined, and all of the region beyond that open for use by all nations.
511. The meaning of air space is clear. It obviously cannot include space where there is no air. It is also not restricted to air of a certain density. The Chicago Convention never intended air space to include space lacking air.
512. Air space should be defined and limited as that area having sufficient density to support aircraft.
513. The term "air space," as utilized in existing international conventions, should be defined as that region in which an air vehicle may derive support from the reaction of the atmosphere.
514. No satisfactory legal definition of "air space" has ever existed. It is suggested that the term be made synonymous with the term "atmosphere" as used in science, and sovereignty restricted to the "sensible height" of the atmosphere.
515. By construing the terms "air space" and "aircraft" as used in the Paris and Chicago Conventions together, it is apparent that "air space" is intended to only apply to that region in which flight from the reaction of the air is possible.
516. The upper limit of state sovereignty is determined by Article 1 of the Chicago Convention, which gives states exclusive jurisdiction over their superjacent "air space." That term was adopted from the term "espace atmosphereque" found in the Paris Convention, and which signifies space which is filled with air. The exact height to which air extends over the earth is not known. Observations of Sputnik I, however, indicate that at 500 Km the density of the atmosphere is extremely thin, and that between 800 and 900 Km only clots of air exist which are separated from each other by distances of several tens of Km's. No matter how rarified the air is, however, as long as gaseous elements are present, it is "air space."

517. It is generally conceded that a nation's jurisdiction over its superjacent air space extends to a height of 7 miles into the atmosphere.
518. Important and justified legal, military, police, sanitary and custom interests of a state in its air space demand that all the air space above a state should be subject to its sovereignty and forbid any limitation in the height up to which air space is within the sovereignty of a state.
519. Analogous to the sovereignty claimed and exercised over land territory and coastal seas, there is a legitimate claim of sovereignty to the air space above the sovereign lands and seas of a state.
520. Just as nations have increased their sovereignty over territorial waters by virtue of more effective control, so also will nations extend their sovereignty over air space, and their claims will be recognized, just as they have been for the sea.
521. Sovereignty in air space signifies the full right of each state to regulate all airways at any height. It means that each state has a right not to allow flights over its territory by any foreign airship, both with crew and crewless, those heavier than air and those lighter than air -- including balloons of any size. Sovereignty also presupposes the right to prohibit transportation of definite categories of cargo and the use of any apparatus, and the right to take any means to cut short violations of sovereignty.
522. The principle of absolute sovereignty over air space should be modified so that each nation has an international guarantee that its interests will be guarded. Thus, the same principle may be applied to both air and outer space.
523. At present, no right of innocent passage exists in regard to territorial sovereignty over superjacent air space, primarily because there is no absolute necessity for such a doctrine. With the coming of the manned space craft, however, the long spiral glide path necessary to successfully land the craft will mean that the craft will probably violate the sovereignty of half a dozen nations in the landing process. Because this will make the right of innocent passage an absolute necessity, its adoption into international air law will probably come about.
524. According to the Paris Convention of 1919, the Ibero-American Convention of 1926 and the Pan-American Convention of 1928 the sovereignty of a state extends to the air space above its territories. Hence space craft in transit through such air space are subject to the particular state's claim of sovereignty. However extension of sovereignty above the air space cannot be justified by implication.

525. Positive international law recognizes the sovereignty of a state as only extending to the upper limit of its atmosphere. Clarification should be made of the status of those areas which, under the provisions of ICAO, have been designated as control areas with no upper limit. Here national sovereignty could conceivably extend into extra atmospheric space.
526. The ceiling of state sovereignty in air space is an attempt to resurrect Fauchille's old zone theory. The ceiling question has long been settled in international law and practice; there is no limit in height to a state's sovereignty.
527. Similar to the sea, air space is only free where no state claims sovereignty. This means that any flight into "free air space" by necessity must lead through an air zone subject to a state's sovereignty.
528. The doctrine of sovereignty in air space did not evolve from the doctrine of cujus est, which was long limited only for determining private rights in the air space above one's land. Even in such cases today, the doctrine has been determined by the Supreme Court to have no place in the modern world.

b. overflights

529. State security is the basis of sovereignty and a criteria of determining altitudes of air space. The balloon incident is but an example of this consideration. Since the balloons menaced the safety of inhabitants and security of air transportation and were used for espionage, the balloons violated sovereignty in air space.
530. Discussing the diplomatic exchange of notes between Russia and the United States on the balloon incident, the author uses the incident as an argument for the desirability of determining the status of outer space and its boundaries, since the Chicago Convention does not specify the height of atmospheric space, and beyond that space no legal status exists.
531. Although the United States has taken the position that there is a valid question as to whether or not exclusive state sovereignty would extend to exclude the flight of a high altitude balloon over a state's territory, there is little doubt that any overflight in, into, or through the atmosphere superjacent to a state's territory is a violation of its exclusive air space sovereignty.
532. According to Alex Meyer's address before the 1952 Congress of Interplanetary Navigation, no state should be obliged to tolerate passage of interplanetary navigation machines through its territorial air. Due to the mechanism of these machines it will be impossible to submit them to the rules of aerial navigation, and hence the rule of imminent passage of airplanes is inapplicable.

533. Satellites travelling around the earth cannot be considered to fall within the "innocent passage" exception to the sovereignty of a state over its air space, and the Chicago Convention does not solve this problem.

B. Attributes of

534. Two attributes are necessary for a justified claim of sovereignty: a) the claimed space must have definable limits and b) there must exist the possibility to exercise "effective" control and power over the claimed territory. Neither of these attributes of sovereignty exists for outer space.
535. The territorial function of sovereignty includes the right of a state to determine the extent to which it will control and police human activity within its territory. Territory is three dimensional. Sovereignty in space recognized by Romans; by Puvendorf; by Westlake.
536. Existing concepts of sovereignty based on discovery and control are not adequate to deal with the problems to be encountered in the exploration and exploitation of outer space. Necessity requires that the problem of space control be examined by an international convention.
537. Within the earth's atmosphere conflicting sovereignty rights exist. These conflicting areas of sovereignty will impede satellite flight, and a nation may enforce its claim to sovereignty by destroying overflying satellites via guided missiles, or more practicably, through diplomatic protest, earthly reprisals, and breaking off diplomatic relations with the launching state.
538. The freedom of the air theory -- both in the form proposed by Fauchille and that proposed by Bluntschli -- must be rejected, primarily for security and policy reasons. Exclusive sovereignty over a state's superadjacent air space is a manifestation of the concept of sovereignty as being three dimensional. Since a state has the right to control human activity within its boundaries in its own self interest, it must of necessity have the right to control all activity in its superadjacent air space.
539. Since no state will be able to exercise effective control and sovereignty over any of the planets, citizens of each state, regardless whether they emigrate to outer space or not, will be put in a new relationship to their respective state. The citizen will thus lose any legal status as an object to be ruled by the state and will achieve full freedom of action versus the state, simply through the fact that large areas, i.e. other planets, exist, in which he could remove himself successfully from the sovereign claim of his native state.

C. Boundaries

a. atmosphere limit of

- 540. Outer space begins beyond atmospheric limits.
- 541. The author defines outer space as that area where the outer boundary forms the limits of all human conception, while the inner, or lower, boundary starts where the absence of air and atmosphere makes normal air travel impossible.
- 542. Instead of setting up all sorts of categories of territorial space, contiguous space, etc., it should be taken for granted that there is the atmosphere, over which some degree of national control is exercised, and above that is space which has an in-defined status.
- 543. Sovereignty in air-atmospheric-space is in accord with present international conventions, consistent with the fact that the atmosphere is an integral as well as constituent part of the earth and follows the earth's rotation. It is logical therefore that atmospheric space should be subject to the sovereignty of the subjacent state.
- 544. Extending territorial sovereignty to cover superjacent space would realistically render space flight and exploration impossible. And since international law demands the same vertical limitation of sovereignty for all states, territorial sovereignty should stop where the universe, i.e., outer space, begins.
- 545. The aeropause is the transitional environment between the atmosphere (in its nontechnical sense) and space.
- 546. State sovereignty extends to atmospheric space since the earth drags the air and therefore the earth and its atmosphere must be considered as one unit.
- 547. Full sovereignty of a state over the air space above its territory is founded upon the natural correlation between land and air. No territorial space upon the earth can be regarded as two-dimensional only, hence the third dimension, air space, must be included within the sovereignty of a state. On the same principle air space above the open sea and stateless territories must be regarded as "free."
- 548. Sovereignty over air space above its territories is essential for every state because the air space forms a necessary and essential part for the life beneath it. There is thus a natural bond and relationship between the earth and its atmosphere.

b. atmospheric lift, height of

- 549. Sovereignty over air space only extends to such space as can be regarded as having enough "air" to make manned air transport possible.

550. "Air space" should be defined as that region in which sufficient atmosphere is found to provide aeronautical lift. The status of the region in which such flight is impossible, but in which the atmosphere is sufficiently dense to affect the operation of rockets or satellites should be determined by an international convention.
551. There is no sound reason for extending the territorial sovereignty of a state above that height which marks the upper limit of the operation of conventional aircraft.
552. Since air space is not free, the question where it ends is very important. Since the term usually refers to that part of the atmosphere which can support aircraft, it should extend no farther than that point.
553. Fixing a boundary between outer space and air space according to instrumentalities requiring aerodynamic lift, though supported by the definition of "air space" in the Paris and Chicago Conventions, is gravely inadequate. Such a delimitation does not provide a reasonably fixed political and geographical boundary and its location will shift with improved types of aircraft. Such a line may become completely impractical when considered in connection with the "X-15" aircraft, which uses aerodynamic lift at lower altitudes, but which can be flown beyond the highest area of aerodynamic lift.
554. It is highly doubtful that the framers of the Chicago Convention wished to equate "air space" with an unknown quantity. The logical interpretation of the term is to equate it with the earth's atmosphere. The view of Cooper and Schacter that the height of the air space is dependent upon the existence of aerodynamical lift would tie national sovereignty to the advance variable factor of technology.

c. contiguous zone theory

555. J. C. Cooper suggests that a new convention establish 3 zones:
- 1) atmospheric space (heights where aircraft now operate)-subjacent state has full sovereignty;
  - 2) contiguous space (up to 300 miles above earth)-sovereignty, but right of transit for non-military ascending or descending devices;
  - 3) outer space - free to all.

556. The three zones of outer space can be analogized to the seas. The bottom zone is like rivers and inland lakes; the second zone is like the three-mile limit; and the outer zone is like the high seas.
557. Summary of Cooper's proposal for three zones of space above earth with corresponding legal rights.
558. Dr. John Cobb Cooper proposes three zones of space:
- 1) territorial space - to the von Karman line - state has complete control of this space.
  - 2) contiguous space - up to 300 miles above earth - state sovereignty but right of transit for non-military flight.
  - 3) outer space - international; free passage to all craft.
559. State sovereignty over superjacent air space should be extended to 300 miles above the earth's surface. State sovereignty over "territorial space"--that region in which aircraft derive their support from the reaction of the atmosphere--should be exclusive; state sovereignty over "contiguous space"--that region above territorial space to a height of 300 miles--should be exclusive subject to the right of transit for non-military vehicles when ascending or descending.
560. The introduction of a draft disarmament resolution into the U.N. which includes the study of "an inspection system designed to ensure that the sending of objects through outer space will be ... for peaceful ... purposes" is evidence that the supporting states feel that territorial sovereignty does not extend to cover space. An international convention is necessary to define "outer space," and the limits of state sovereignty. It is suggested that three zones be established:
- 1) air space--exclusive state sovereignty;
  - 2) contiguous space--sovereignty with the right of free passage while ascending or descending;
  - 3) outer space--free for use by all nations.
561. There is no need to establish a "contiguous" area between air and outer space like that proposed by Cooper.

- 562. A contiguous zone in outer space rests on no positive fundament, is arbitrary and requires agreement by convention.
- 563. Cooper's proposed contiguous zone is neither necessary nor useful. There is no reason to govern this area by special rules. The analogy to the territorial sea is bad, for there are no immovable shores in the air space.

d. effective control theory

- 564. Territorial sovereignty should extend into space as far as control and utilization of space is possible by the subjacent state. Theoretically, however, it would probably be more realistic to recognize that the upper limits of such sovereignty should be set at the point where the earth's gravitational field ceases to be of controlling influence.
- 565. Two primary proposals have been advanced to delimit the sovereignty of a nation over its superjacent air space:
  - 1) setting an arbitrary limit on the height to which a nation's sovereignty extends in space;
  - 2) the effective control theory of Cooper. The arbitrary limitation proposal lacks realism in not recognizing that nations have always based sovereignty on power; and the effective control theory springs from poor theory in allowing a nation to measure right by might. There is little doubt, however, that if a nation was faced with a threat of satellite observation, it would give effect to the effective control doctrine.
- 566. Arbitrary boundaries of territorial sovereignty drawn in the atmosphere on the basis of scientific data do not sufficiently take into account the practical legal problems of control which will be faced. The best boundary scheme which has been proposed is that of Professor Cooper.
- 567. Sovereignty should only be granted to such heights as any one state is able to explore and use, and not to the extent of the earth's gravity.



568. Upper atmosphere which is beyond the effective control of states does not belong to anyone. By analogy to the freedom of the seas the upper atmosphere can be considered as open air zone, in general use by all nations.
569. Positive international law, culled from statements of Paris and Chicago Conventions drafters and general international law, establish that "air space" is not limited to physical or meteorological boundaries, but extends to usable space, i.e., within the future reach of man's activity. Hence sovereignty extends to upper limits of human utilization of space.

All theories limiting sovereignty to a height less than that attainable by human means, are in essence territorial zone theories, influenced by maritime law and rejected as early as the Paris Convention.

Hence, no state may occupy the space not above its territory and each state has the right to extend its judicial order to space above the state's territory.

570. To permit a state to exercise sovereignty over its superjacent space to any height at which its technology permits it to use or control its superjacent space would lead to a continuous change in the boundary of a state's jurisdiction, and would result in a doctrine approximating the ad coelum doctrine.
571. The ad coelum doctrine is inapplicable today because the state cannot effectively police its superadjacent space beyond a certain height, and because space vehicles operate at altitudes and speeds too great for the operator to know when he passes from one superadjacency to another.

572. The "effective control" theory of sovereignty is based upon the premise that any nation has complete jurisdiction over its superjacent air space to the height at which it can effectively assert such sovereignty. The basic fallacy of the theory is its attempt to equate sovereignty with national power.
573. To adopt the "control" theory of air space sovereignty would be to legally recognize that might makes right. A more reasonable theory would be to limit state sovereignty to its subjacent air space -- that region in which the atmosphere will support aircraft -- and to declare outer space the property of all nations.
574. Cooper's idea of effective control as the boundary of national sovereignty over air space is a version of the "Might makes right" rule without any real justification for it.
575. Cooper's proposal to extend sovereignty to the height that the most advanced state can control is no more than the "might makes right" rule. The better rule is to confine sovereignty to the superadjacent air space.
576. Schacter's use of atmospheric "lift" as the criteria of territorial sovereignty over superjacent air space is unrealistic because it does not have critical reference to the problems of space. Cooper's view that every nation should control space as "far as their scientific progress permits it" would enable a nation with extraordinary scientific resources to extend an empire into deep space.
577. Cooper's idea - that sovereignty should extend as high as the most advanced nation is able to control space - will not work since lesser nations cannot control this area, and since boundaries would change constantly.
578. Adopting Cooper's "control" theory of sovereignty over outer space would serve none of the major objectives to be sought from formulating rules to govern outer space. The upper boundary of territorial sovereignty, however, should be limited to the area to be used by conventional airborne craft; this would not depart from the concept of air space as it is understood today.
579. None of the proposals which have been advanced to date are completely adequate to answer the question of the height to which national sovereignty extends. Cooper's control theory is wrong in basing sovereignty upon national power; the air space theory is unrealistic. The ultima to the determination of the height of sovereignty must be decided by international agreement.
580. The important attribute of sovereignty, the possibility and power to exercise sovereign powers, is now within the reach of a state claiming sovereignty over air space above its territory.

581. Air space above a state's territory should be within its sovereignty because a state is able, due to modern technological developments, to exercise its sovereign powers over it --- an important attribute of sovereignty.

e. gravitational field theory

582. The dividing line between air space and outer space will be the precise point where the effect of the earth's attraction ceases.
583. Setting the boundary of a state's sovereignty over its superjacent air space at the point at which the gravitational pull of the earth ceases is not necessarily a workable solution to the sovereignty problem. Such a boundary, however, should provide an absolute upper limit for any meaningful discussion of where the boundary should be drawn.
584. Sovereignty of a state has to end where the natural laws of the earth give way to the natural laws of the universe. This line is reached where the earth's gravitation loses its effect, or where air travel becomes impossible, i.e. at a height of about 60 miles.
585. To say that sovereignty should extend as far as gravity extends in order to protect the subjacent nation from falling objects is fruitless because high fast moving bodies cannot tell over which territory they pass.
586. The idea that sovereignty should extend as far as gravity extends is unworkable because it cannot be enforced, and if it could be, it would impede progress in space experiments.
587. Reviewing the writings of Cooper, Kroell and Meyer, the author maintains that sovereignty cannot be extended beyond the altitude of the earth's gravity.

f. in general

588. A discussion of the physical boundaries of space and suggestions for drawing new ones.
589. The more or less elliptical orbit of satellites should be taken into account when defining the altitude at which the words "outer space" can be applied.
590. Air space above a state's territory should be within the sovereignty of the state, even though no boundaries are observable in the air. It is enough to satisfy the requirements of sovereignty if boundaries are definable and possible.
591. A general review of the sovereignty theories advanced by Messrs. Jenks, LeGoff, Colper, Haley, and Schacter.

592. Summary of the positions taken as to the upper limits of national sovereignty at the 1956 meeting of the American Society of International Law by Cooper, M.K.Roy, Alex Mayer, Alberta Colclaser, Arnold Knuath, and Oscar Schacter.
593. Six basic definitions have been advanced of "air space", i.e., that area over which the subjacent state has exclusive sovereignty: (1) space up to the point at which the atmosphere will not support aircraft; (2) Von Karman's line; (3) space below the point at which an artificial satellite may successfully orbit the earth; (4) all the area superjacent to the earth in which there is atmosphere; (5) height without limit; and (6) the height to which a state may exercise effective control. Any definition, however, is premature until it is decided whether to pursue the objective of an air space upper boundary or whether to consider the proposals for new international agreements dealing with flight controls irrespective of the sovereign status of different space areas.
594. Several theoretical limits of territorial sovereignty have been offered by leaders in space law. Haley would like to see the jurisdictional boundary placed at fifty-two miles, that altitude at which the lifting power of the atmosphere ceases. Cooper would like to see three levels, the first being absolute sovereignty, the second an area through which only non-military craft would navigate, and the third open to all instrumentalities.
595. Two primary theories have been advanced for limiting territorial sovereignty over superjacent air space. The first would set an upper limit of absolute sovereignty, measured by the edge of the atmosphere; following this zone, there would be an area of contiguous space within which space vehicles would have the right of passage only if non-military vehicles; and thirdly, a zone of free passage. The second theory would eliminate the contiguous zone. Although both theories have been advanced, both present a common question for solution by jurists -- the problem of adequately defining the upper limit of a nation's absolute sovereignty.
596. There are three theories as to the high altitude jurisdiction of states:
- 1) where the air space ends (either at the point where there is no more air or where there is insufficient air to sustain flight;
  - 2) where the earth's gravitation is offset by other gravitational forces;
  - 3) where the subjacent state can no longer exercise effective control.

Since this issue is primarily political, it appears that the third theory will be the one used.

597. In contradistinction to territory which is naturally divisible, air does not admit division except by means of international agreement. Presently, vertical division of atmospheric space is accepted in conventional law.
598. To satisfy the requirements of sovereignty it is enough if boundaries are possible and definable, and they do not have to be visible and observable. Hence this objection cannot be raised against the claim of sovereignty a state makes upon the air space above its territory.
599. That area filled with air layers, up to about 300 Km is air space, and beyond that is outer space. The exact boundary is scientifically uncertain and not physically measurable. It will probably be necessary to somehow fix numerically the geographical boundary between air space and outer space by international agreements.
600. Regions beyond the atmosphere should be divided into:
- 1) solar space (interplanetary space) the area of the solar system.
  - 2) galactic space (interstellar space) the area of the Milky Way.
  - 3) extragalactic space - all else.
601. The eventual drawing of a circle of cosmic space should avoid the great difficulties with which the international community is faced in the question of the international law of the seas.
602. The upper limit of sovereignty should be the inosphere. This would allow nations to preserve privacy, and not hamper scientific experimentation.
603. 500 miles above the earth is a reasonable maximum height for nations to claim sovereignty over the air space. Above that, space should be free on analogy to the law of the high seas, and effective control could not be exercised. Below this height, states should be liable for damage caused by their spacecraft.
604. A 300 miles ceiling on national sovereignty is well beyond the region in which aerodynamic flight is possible - the limit implied in the Chicago Convention - and at the same time below the permissible orbit in which satellites can safely travel. On the other hand, 300 miles is an arbitrary figure since it may not actually correspond with the physical boundaries of earth's atmosphere. But, to fix the limit on sovereignty at higher than 300 miles is likely to turn the effort of delineation into meaningless academic exercise since a problem will arise how a nation could enforce its sovereignty at that fantastic height.

605. Outer space should be used to designate all of that region beyond the area of the earth's atmosphere. Although the line of demarcation between the terrestrial atmosphere and outer space is in dispute, it may be estimated as being somewhere between 310 and 620 miles. All the area below outer space should be designated "air space", and outer space and air space together should be designated as "flight space." Air space is subject to exclusive state sovereignty.
606. Space above 100 miles should be free space on analogy to the seas, except that it should be subject to U.N. control.

g. need for determining

607. Law and science must work together in defining and separating air space from outer space since there is no fixed separation between the two.
608. The concept of sovereignty of the air space above a political territory has been firmly established through international agreement. Although no need existed in the past to determine the upper limit of air space for sovereignty purposes, the advent of space satellites makes it imperative that such limits now be established.
609. The legal distinction made between outer space and air space will have to be translated into a numerically defined line, for practical reasons. The cut-off point between air space and outer space could be drawn somewhere between 150 and 225 miles above the earth.
610. Under present air law satellites violate the sovereign air space. Even though no nation has protested against these violations, the situation is urgent enough to demand early clarification of the status of earth satellites while in transit through air space.
611. Outer space is devoid of legal status. Although sovereignty cannot extend to outer space, some status is indispensable to avoid conflicts of claims and to regulate launching of satellites, damage and peaceful utilization.
612. Several questions of General International Law in regard to the control of space activities require immediate resolution: (1) Is it either advisable or necessary to determine the extent of territorial sovereignty over superjacent airspace? (2) Can general problems of international space flight be adequately resolved without determining the national or international status of "outer space?" (3) If an upper boundary of territorial sovereignty is determined, at what height should it be fixed, and what should be the legal status of outer space beyond such height?

613. Principle of cujus solum has been discarded for private property rights versus public interests in the air space, i.e., aircraft transportation. Similar development will have to follow with respect to national sovereignty over outer space, where the doctrine of cujus solum must be abolished as unworkable and unpractical.

h. political factors affecting

614. Power and security factors will be the prime determinants of the upper limit place on state airspace sovereignty.
615. A purely static spatial solution to the problem of jurisdiction and sovereignty in outer space seems hardly relevant to the dominant political, military, and economic policy factors involved.
616. Those theories which attempt to mechanically mark the limit of territorial sovereignty over superjacent airspace by utilizing the laws of aerodynamics are not realistic in failing to take into account the political and economic factors which enter into the concept of national sovereignty. A better line of demarcation would be to limit sovereignty to the minimum altitude required to produce the same commercial and military protection which currently exists. This limit would be approximately thirty miles. In time of war a neutral state should be allowed to assert sovereignty to a height of four hundred miles.
617. Any proposed theory for establishing the limits of national sovereignty over space must be tested against the totality of major underlying variables which are likely to affect authoritative prescriptions by decision makers in reference to the problem of the upper extent of sovereignty.
618. The onset of exploration and exploitation of space will increase the relative political and military importance of time as compared to distance. Hence, under present conditions, the military integrity of a nation **is** represented by the three mile limit; this will eventually be replaced with a limit represented in units of time, not distance.
619. A history of the development of the concept of the three-mile territorial belt of sovereignty over the seas, and of the doctrine of sovereignty over superadjacent airspace reveals that the determining factors have been national security and military ability to command adherence. See also: Boundaries
620. The primary objectives to be sought in fashioning rules of sovereignty over outer space are: (1) national security and the maintenance of peace; (2) investigation and utilization of the resources of outer space.

621. Outer space is that space above airspace. Although sovereignty is limited to airspace, its altitude is based on considerations of national security. Hence, the outer limit of state sovereignty must be established in such a manner so as to protect the state against encroachment on its territorial sovereignty and independence.
622. If an overflying spacecraft endangers national security, the subjacent nation will stop it if it can, and if it can't, the question is academic. If the flight above does not endanger the nation, reciprocal tolerance which characterizes the law of the sea will probably prevail.
623. The upward extent of sovereignty, irrespective of whether it is determined scientifically, or by analogy to maritime law or based upon interpretation of aerial conventions, will be predicated upon the policy of national self-preservation and security as minimum goals. Hence any solution - or upper limit - must be beyond the minimum requirements of national security in order to survive the scrutiny of decision makers.  
On the other hand, acceptance of an expandable height limit would not only be impractical, but lacking in effective control by subjacent states.  
If however, an effective inspection method is arrived at, the problem of scientifically fixing upper limits to sovereignty would be facilitated.
624. The mere possibility that outer space flight makes it possible to overlook or "spy" upon the earth's surface does not suffice to give sovereignty over outer space to the subjacent state.
625. In the present state of international relations, the higher zone of space, if recognized as free, allows a potential enemy to take actions prejudicial to the security of the subjacent state, such as reconnaissance, espionage and strategic meteorological research. Thus, limiting sovereignty in space means, paradoxically, that foreign planes are more of a menace than invisible satellites.
626. Since states can claim control beyond the three mile limit for customs purposes, i.e., in order to guard against illicit immigration, the same interests indicate that the state can control the air space over adjacent waters to a similar degree. Since planes can travel faster than ships, a comparable distance is 200 to 300 miles in altitude.



627. For motives of defense, as well as economic protection and aggrandizement, the earth nations will probably continue to claim exclusive sovereignty over their superjacent airspace. As technological competence advances, nations will in all probability lay claim to certain random space areas for the protection of special territorial interests. For this reason, initial controversies will in all probability focus on problems of allocating space areas between exclusive territorial use and inclusive world use, and ultimately, on fixing national and free boundaries on the basis of national space activities.
628. A defense of airspace sovereignty in view of technological development of airplant destructive capabilities, but with the conclusion that the right of innocent passage is not incompatible with legitimate interests of subjacent states.
629. The four leading theories as to the upper limit of territorial sovereignty over space are those propounded by Schacter, Jenks, Haley and Cooper. The flaw existing in the theories of Schacter and Jenks is the failure to recognize the role which national power will play in the development of space law. And although all four theories place an upper limit on territorial sovereignty, all four theories fail in one respect: to recognize the need for a space police force to be controlled by the U.N.
630. Territorial sovereignty over superjacent space should be extended to a height which would allow a neutral nation to forbid the passage over it of any military guided missile designed for a distant state.
631. The status of outer space is analogous to the high seas - it is res communis and not subject to sovereignty. Sovereignty in outer space is neither practical nor necessary to protect the interests of subjacent states. At high altitude a state may be menaced by vehicles not directly "above" that state's territory.
632. International law recognizes sovereignty without requiring states to demonstrate authority in a permanent fusion and in all parts of a state's territory, or to always stop access by military manner. It is sufficient that any mode of sanction or reprisal is taken when frontiers are violated. Thus sovereignty can extend to outer space even if no technical means are available to guard frontiers in high altitude and, furthermore, more or less effective control of high space may not be impossible with future technical developments.

i. problems in determining

- 633. The impossibility of setting vertical boundaries between national sovereignty in outer space will not be cured by scientific progress. Even if science could do this, this would not justify legal claims there.
- 634. States cannot claim unlimited sovereignty over the space above them because perpendicular lines extending up from their borders would widen out towards infinity since they are drawn from the surface of a sphere.

j. von karman line

- 635. The boundary between air space and outer space should be the von Karman line because aircraft can fly no higher. National sovereignty over air space should end at this line.
- 636. The jurisdiction of space law - from a scientific point of view - would occur when aerodynamic lift ceases and the Kepler force takes over. This occurs when an object reaches approximately 275,000 feet and travels at a rate of 35,000 feet per second.
- 637. To establish sound bases for demarcation of air law and space law jurisdiction it is necessary to consider that the conditions for accomplishing aerial flight, that is to circle at a constant altitude, are weight equals aerodynamic lift plus centrifugal force. Basic theories are discussed, and it is concluded that further study is required to establish adequate jurisdictional criteria.
- 638. Although there is little agreement on what height should mark the limit of territorial sovereignty, there is general agreement that at some point territorial sovereignty over superjacent space should cease. The limits of territorial jurisdiction over space may be scientifically applied by using von Karman's line -- the point at which flight is only possible through the utilization of centrifugal force because of the lack of adequate atmosphere to supply aerodynamic lift.
- 639. The question of the point at which space law obtains jurisdiction over the flight of a space vehicle may be determined by the von Karman line. This is premised upon the truism that to accomplish flight, weight = aerodynamic lift plus centrifugal force. At any point at which flight is sustained through the aerodynamic lift supplied by the earth's atmosphere, air law governs; at any point at which aerodynamic lift is not sufficient, and flight is only accomplished through centrifugal force, space law has jurisdiction of the vehicle.

640. The primary jurisdictional line between air space and outer space should be determined by the von Karman line. That line is premised upon the formula:  $\text{flight} = \text{aerodynamic lift} + \text{centrifugal force}$ . Outer space commences at that point where, because of the lack of atmosphere, centrifugal force is necessary to maintain flight. Final determination of the von Karman line should be promulgated by the U.N. and the ICAO.
641. By virtue of the von Karman line and other physical and biological considerations, there may be ascertained three areas of flight: (1) the aeronautical regime; (2) the corridor of atmospheric escape; and (3) the astronautic regime. The first is already legally regulated and the third is free to all. Writers differ as to the status of the escape corridor, but no decision should yet be made.
642. Two factors make it necessary to limit territorial jurisdiction over superjacent airspace: the impossibility of a nation effectively controlling outer space superjacent to its territory; and use of the rotation of the earth, the impossibility of accurately defining or fixing territorial boundaries in outer space. Because it is impossible, however, to define "atmosphere" in terms which are satisfactory to both politicians and scientists, jurisdiction may not be limited in terms of the "atmosphere". The most practical point at which to end national jurisdiction would be von Karman's line, espoused by A. G. Haley.
643. The Air Force X-15 is both aircraft and space craft and thus blurs the distinction between the two, as well as complicating the use of the von Karman line as the boundary of space.

The development of such an aircraft casts doubt on the wisdom of the space boundary proposed by Haley, the von Karman line, since that boundary is predicated on the premise that conventional aircraft are inoperative above the limits of aerodynamic lift. The approximate height of the boundary which would be established by the von Karman line is 53 miles.

#### D. Status of Outer Space

##### a. activity as determining

644. Resolution of the question of sovereignty at a given line would not solve the danger of observation from space, since observation may be made from non-superjacent space.

Hence activities in space will determine the horizontal boundary of territorial sovereignty.

645. The civil law principle that allows flight over the property of a landowner if no interest of the landowner is adversely affected might by analogy be extended to apply to national sovereignty over space.

646. Through the U.N. or through multilateral treaties, the proposition should be established that although each state may bar the passage of unfriendly rockets and satellites, no nation may prevent the passage of rockets and other instrumentalities conducting scientific investigations, though the latter must conform to safety rules adopted by international conventions.
647. The likely alternative to sovereignty as a basis for legal control of outer space is classification by international agreement of proscribed activities in outer space according to their purposes and effect.
648. So long as Sputniks I & II and their successors are scientific rather than military satellites, their orbits should not constitute violations of national sovereignty.
649. States should establish the principle, as an interim proposition, that no high altitude satellites or rockets conducting scientific investigations should be barred from passage over the states so long as they conform to standardized rules of safety. States should not claim jurisdiction over that area beyond the aerospace.
650. Because of the difficulty in projecting national boundaries into space, and the difficulty which would be encountered in attempting to effectively nationalize sovereignty over instrumentalities in space, the stratosphere and the space beyond should be considered as res nullius and incapable of national dominion. The question which should concern space law theorists is not to what height in space national sovereignty extends but for what purposes space may be used.
651. Although international law provides no definitive norm for outer space, it would be reasonable to recognize that for the purpose of scientific investigation no state has the right to subject outer space to its legislation, administration and jurisdiction.
652. National sovereignty will probably be preserved in airspace because of security considerations. Foreign vehicles will be able to use superjacent outer space only with specific consent or for peaceful purposes.
653. The division of air space into zones, each having a different legal status, can serve no practical purpose in formulating rules to govern national conduct in space. The true view should be that the stratosphere and space beyond are incapable of appropriation; and the concern of theorists would be with the purposes for which space may be lawfully used, and not when space legally begins. Two terms should be adopted to express **this**: "atmosphere" -- the zone which is subject to state sovereignty; "space" -- the zone outside the atmosphere.

654. The limits of state sovereignty cannot be other than arbitrarily established at a given distance of altitude, however determined. Protection is the reason for the assertion of sovereignty, and hence its limits will be decided not by legal opinion, but by determination of appropriate governmental agencies or by acquiescence in assertions of sovereign states. Hence, activities in space rather than sovereignty up to a given line are the prime problems affecting the security of nations concerned, and activities in space will determine states' tolerance of particular satellites.
655. It is not possible to establish spatial limits to airspace sovereignty by reference to current technical achievements, and once embarked on sovereignty based on such a concept there is nothing to stop its extension to infinity. Similarly intermediate zones should be avoided since there is no practical technical difference between air and outer space.

Hence, the nature of the flight rather than its spatial position or the nature of the instrument should be the governing factor to determine whether air space sovereignty is violated. Furthermore, a geometrical definition of boundary is not necessary for a practical code for outer space.

656. As an interim solution to the problem of the extent to which a subjacent state may exercise jurisdiction over its superjacent airspace, the principle should be established that the state's jurisdiction is unlimited with respect to the passage of warlike and unfriendly satellites and rockets, but limited with respect to space vehicles engaged in scientific exploration of space, providing the latter conform to rules of safety adopted by the nations of the world as a working entity.
657. It is questionable whether static zonal delineation of outer space is possible or worthy of accomplishment. For the purpose of human control and planning an arrangement based upon types of spacecraft, probable functions and potential dangers, including physical characteristics, may be preferable. It is probable that the problem of boundaries will eventually become one of activities with a contiguous zone, e.g. phrased in terms of type of activity and relevant intervals of time rather than in terms of location.

b. application of existing law

658. In the light of the novel questions posed by space navigation and flight, it is doubtful that any valid determination of jurisdictional airspace boundaries may be made by an interpretation of existing international aerial conventions.

- 659. Technically, all six satellites which have been launched have violated the national sovereignty of those nations over which they have passed. Practically, however, the ad coelum doctrine is not applicable to space, and should not apply.
- 660. Little importance should be attached to attempts made to solve the problem of the extent of territorial sovereignty over super-jacent air space by reasoning analogously from other fields. Such analogies do not reflect the actual relations of states in this particular matter. Some weight however, should be given to such analogies, because they are sure to be cited as precedents in actual disputes.
- 661. The most influential contemporary thinking leads one to the conclusion that basic maritime principles in regard to territorial sovereignty and jurisdiction, as they now apply to the high seas, must be transferred to govern the relation of nations in space.
- 662. The problem of the control of space beyond the altitude at which national sovereignty exists presents no true analogy with the status of the high seas outside of territorial waters.

c. freedom of

- 663. The principle of exclusive territorial sovereignty over super-jacent airspace is derived from doctrines developed at a time when airspace could only be effectively used to a very low height. No workable analogy may be drawn from this general doctrine which is capable of being applied to outer space.
- 664. Outer space should be defined as that region in which the atmosphere of the earth in no way affects the operation or flight of space vehicles. This area should not be subject to the sovereignty of the subjacent state.
- 665. The term "flight craft" should be used to designate any vehicle which is capable of flight in either air space or outer space. Such a designation would remove any ambiguity to the status of any vehicle not within the definition of "aircraft" adopted by the Chicago convention, and would cover rockets, space vehicles, etc.
- 666. Standard legal terminology should be adopted for referring to the upper regions of the atmosphere. The following terms based upon the nomenclature of astronomy, are proposed: (1) solar space; (2) galactic space; and (3) extragalactic space.
- 667. Space begins where earth's atmosphere ends, and is divided into three regions; Interplanetary, Interstellar, and Intergalactic.

668. The territorial sovereignty of a state over its superjacent airspace should stop at some definite point in the atmosphere. All space over this height would be subject to the sovereignty of the U.N., and that body would promulgate all rules to cover legal problems arising in space.
669. The mere possibility that space vehicles will have a large and unobstructed view of the earth's surface does not justify extending territorial sovereignty to outer space.
670. The principle cujus est..., formulated when earth was conceived as immobile and the center of the universe, cannot be applied to space today. The rotation and movement of the universe renders mathematically impossible the establishment of a vertical projection into cosmic space to set up some right of sovereignty. Furthermore, no state has yet evoked the right of vertical projection of sovereignty in upper space, and this amounts to unwritten jurisprudence on the subject.
671. Although outer space is a judicial vacuum, there are two primary arguments against extending national sovereignty to outer space:
1. Cujus solum never meant anything but an allegorical example of property infiltration.
  2. Due to the revolution of the earth vis-à-vis upper space, it is impossible to determine where a spaceship is at any given time.
672. Circumstances and technology should determine whether outer space is legally regarded as: (1) independent; (2) res communis; (3) within the sovereignty of a particular state.
673. Resumé of views expressed in the 1956 Washington Meeting of the American Society of International Law with the conclusion that although the meeting did not advance the positive law of the status of outer space, it permitted eminent specialists to exchange views on the actual and future state of the law.
674. The law of extra terrestrial space will be strongly affected by the notion that state sovereignty is three dimensional, and that national air space is merely appurtenant to land territory.
675. Because of the similarities between the seas and space, the concept of the freedom of the seas should be extended to deny the right of a nation to claim sovereignty over superjacent space.
676. There is no known means of asserting a country's sovereign rights over outer space or of putting instruments aloft permanently to stand guard in defense of their sponsor's interests.
677. Outer space is free due to precedents established during the IGY, because outer space cannot be divided vertically, and because there is no known means to assert or defend a claim of sovereignty to outer space.

678. Territorial sovereignty over superjacent air space, developed because of the exigencies of national security, should not be extended into space because (1) such an extension would hamper the development of space flight and (2) confusing problems of control would result. The establishment of international rules to govern free space may be easily established once the larger problems of sovereignty over celestial bodies and the legal status of space stations have been solved. Once this has been done, space may be considered as roughly analogous to the high seas, and a modified form of maritime law adopted.
679. If present-day international law in respect to sovereignty should be extended to outer space one small state could prevent outer space flight, since the orbit of a space vehicle, once launched, does not allow for any change in its course, and nearly every point on the earth will be overflowed if the orbit is at a certain angle to the equator.
680. Because the distance between the earth and outer space makes it impossible to determine when an object in space has passed a territorial boundary, and because of the problems involved in attempting to assert sovereignty in space, outer space should be considered a free area.
681. Since no spatial or natural correlation exists between outer space and air space on the one hand and outer space land territory on the other hand, sovereignty should not be extended to include outer space.
682. The interest of a state in guarding its political integrity against damaging activities in outer space, such as observation of its land area from the space craft of another nation, is not a sufficient reason to extend territorial sovereignty to cover superjacent space. Further, no realistic spatial or natural correlation exists between outer space and specific areas on the earth's surface. Rather, outer space should be considered as free for use by all nations, and should be treated as analogous to the air space above the open seas and stateless territories.
683. Due to the rotation of the earth, the revolving motion of the Milky Way galaxy, and the expanding and contracting motion of the Universe itself, it is impossible to know in what state's superjacent space a rocket flying out of the solar system is at any given moment. Hence, the notion of extending territorial sovereignty to outer space is arbitrary and devoid of scientific support.



684. Territorial sovereignty over superjacent airspace cannot be realistically extended to cover outer space because: (1) as the earth rotates, it is meaningless to think of regions of outer space as laying "above" a particular country; (2) the nature of an artificial satellite makes it impossible for it not to be above a large number of countries within a few hours.
685. Although the established principle is that state sovereignty extends indefinitely, in view of the rotation and revolution of the earth and the movement of the galaxies, the position of national space would be constantly changing -- an absurd result.
686. Sovereignty presupposes a precisely defined area of exclusive jurisdiction, and no such precise delineation is possible in outer space. Vertical demarcation in infinity becomes increasingly blurred and moreover, horizontally there can be no "above" the earth because of the rapidly spinning globe. Thus sovereignty in the infinite would no longer be directly related to control over the surface of the earth. Thus, outer space is by nature indivisible and the notion of state sovereignty cannot apply in that space.
687. Outer space does not come, according to positive law, under the sovereignty of the subjacent state because the cosmic nature of outer space does not allow vertical division; the Paris and Chicago Conventions apply only to atmospheric space; the criteria of state power is the yardstick of might, by which the law cannot be measured; and the theory of flight space rather than outer space is unacceptable; contiguous zones lack positive boundament; and the lack of protest over excursions into outer space establish an unwritten jurisprudence.
688. Since space is in constant motion, there is no segment of space, in the sense of segment of land or sea, with definite boundaries over which a country can claim sovereignty. "Segment" in space is but an intellectual conclusion which in the philosophical sense of the term cannot be said to exist.

d. need for determining

689. No norms of international law define the legal nature of extra-atmospheric space, hence the most urgent problem is to determine the juridical status of cosmic space.
690. Because of the practical problems involved in attempting to project territorial sovereignty into space, a whole new body of rules must be developed to cover the problems peculiar to the exploration and exploitation of space. The most logical starting place is the recognition that space, like the sea, is free territory.

691. Summarizing prevailing views on possible uses and misuses of outer space, a survey of the full galaxy of unofficial opinions of what is or should be the status of outer space or whether there is need or desirability of such a determination follows. The extensive and exclusive unofficial opinion survey is in lieu of official stands that governments are reluctant to take.

e. political factors affecting

692. Zones in air space as limiting sovereignty is illogical and arbitrary. Rather than limiting sovereignty in height, freedom of air space should be recognized subject to the legitimate interests of subjacent states. This principle will substitute the test of the activity in air space rather than the boundary.
693. The interest a state has to guard itself against damaging influences and interferences from outer space is not enough to justify an extension of sovereignty to cover outer space.
694. There are no military reasons to grant sovereignty over outer space to any state, nor is sovereignty needed to enforce police, health or customs regulations, as is the case with air space.
695. A state cannot have sovereign powers over outer space since the essential attributes of sovereignty are lacking: outer space cannot have definable limits nor can any state exercise effectively its sovereign powers over it.
696. The justification for the claim and right of sovereignty of a state over its superjacent air space is largely based upon the intimate relationship between air and land, and the necessity of the air space for the life beneath it. No such justification exists with regard to outer space and life on earth.
697. Sovereignty over outer space is not necessary or essential for any given state since no essential relationship exists between outer space and life on earth analogous to that between air space and life.
698. Three factors underlay the development of exclusive national sovereignty at lower altitudes: commercial development, military security, and private law necessities. The practical problems involved in space flight are quite different than those involved in conventional flight, however, and an examination of these problems leads one to the conclusion that the concept of national sovereignty should not be extended to cover space flight.

699. The threat of observation from space is not a convincing reason for extending state sovereignty into outer space. The possibility of observation will exist even if sovereignty reigns in outer space, and, furthermore, observation of the earth's surface has never been a reason for recognizing sovereignty in air space.
700. Hingorami's view that sovereignty goes all the way up because air space is not confined to space containing air, is incorrect. Sovereignty in outer space is impossible factually and legally. Factually because exact boundaries could not be set, even despite scientific advancement; legally because the lack of air in outer space eliminates the possibility of the states claiming that this space is an integral part of their territory.
701. Space is nothing but a notion, like time, and does not exist as an empirical precept. Since space is not definite or an element, to discover the notion of space requires meta-judicial precepts. Hence one cannot appropriate or divide space, which is not even an empirical precept. Nor can one speak about air space or outer space, since space is a meta-judicial precept.
702. If any agreement on horizontal altitude boundaries is to be made, it should await the availability of all needed data about the area concerned. The jurist and statesman should proceed with caution since a mistake made now in fixing the upper limit of air space may lead to grave future difficulties.
- f. res communis
703. Outer space, by its nature, cannot be appropriated by any nation and must therefore be regarded as res communis.
704. Space beyond the atmosphere is a res extra commercium incapable by its nature of appropriation on behalf of any particular sovereignty.
705. Outer space should be open to all humanity as the common property of all nations.
706. Sovereignty should not extend to outer space and space.
707. No right of sovereignty can exist over space that is indivisible and yet constantly changing. Hence outer space is not res nullius. By its very nature, outer space must be considered res communis. That does not mean, however, that international regulation of the use of such space should be refused.
708. Outer space should be regarded as "free space" analogous to the air space above the open seas and stateless territories.

709. Any sort of exclusive extra-terrestrial sovereignty over outer space should not be allowed, and outer space should be considered as belonging in its entirety to the whole world.
710. Outer space and the celestial bodies should be treated as the high seas are: not owned by anyone and open to all, but not totally lawless. (Schacter) See also: Celestial Bodies
711. Since there is no factual or legal justification for the assertion of national sovereignty in outer space, that area must be regarded as a free area like the high seas.
712. Territorial airspace should be limited to that altitude attained by conventional aircraft and vertical rockets. The "orbital" distance, i.e. to the limit of the earth's gravity, should be the common property of mankind. A legal order should be established on the basis of free, equal and peaceful use of outer space, with no nation allowed excessive dominion.
713. Two factors are necessary to enable a nation to assert sovereignty over territory: (1) the area must have boundaries which are capable of determination; (2) the state must be able to assert "effective control" over the territory. Because neither of these factors are found in regard to outer space, and because space may not be considered an integral part of any state's present territory, it must be considered as res communis and incapable of appropriation.
714. The ad coelum doctrine of international law will not work for outer space because the earth is a sphere. Space beyond the atmosphere must remain the common property of all. See also: Status of Outer Space
715. Outer space should constitute a universal public domain, which no state can occupy or in which it may act detrimentally to other states.
716. The air medium above the immediate interests of states is common to all, and should be put to peaceful use by humanity without any condition or restriction.
717. No single nation should be able to exercise sovereignty over outer space. Extra-terrestrial space should be free for utilization by all nations.
718. The course of international conduct since the first satellite flight is evidence of the acceptance of the principle that outer space is not capable of appropriation and is free for use by all.

719. Theorists are in accord that freedom of deep space, like the analogous freedom of the seas, is the only solution to the problem of national sovereignty over superjacent air and atmospheric space.
720. Since outer space is not subject to any state's claim of sovereignty and due to its very nature cannot be made subject to such a claim, it is the right of all states to use it, subject only to the limitation to respect the fundamental rights of other states similarly using outer space.
721. The basic principle of space law must be that no nation has sovereignty above the aeropause. Such space can be utilized only for the benefit of all mankind and to the detriment of no other intelligent creature. See also: General Principles of Law.
722. Though space is res communis, international control and limitation to permit equitable and coordinated use and avoiding abuse and conflict is necessary. Hence, "free use under international control" should be the status of outer space.
723. To avoid territorial rivalry between nations, the celestial bodies and outer space should be considered as analogous to the high seas, and available for use by all nations. Scientific installations and the exploitation of mineral resources should be subject to special rules to allow individual ownership by nations.
724. Although it would probably be much too premature to attempt to adopt at the present time an all inclusive legal code for the regulation of space, it would not be premature to recognize at the present time the inception of the general principle that space is not subject to appropriation by national states. This is very apparent in the premise that the U.S. and the USSR have operated from in regard to the launching of their orbiting satellites.
725. Two factors will inevitably lead to the recognition of space as the property of all nations: (1) any point in space dominates the surface of two or more nations at one time. This will eliminate the military security factor presently associated with territorial boundaries extending through air space. (2) The need for dispersed, international ground control stations to control the flight of space vehicles.
726. The peculiar problems faced in attempting to determine sovereignty over space and the celestial bodies are only solveable by declaring that space and the planets, like the sea, are the property of all nations. Special cases of exploitation of resources may be solved by analogy to the legal rules which govern "sedentary fisheries."

B. WRITINGS OF COLLATERAL RELEVANCE TO SPACE LAW

ACTIVITIES

A. Air transportation

- 727. Traces the history, development and role of the USSR in International Civil Aviation, including descriptions of Soviet commercial aircraft and present and proposed Soviet air-routes.
- 728. Areas which are both militarily significant and essential as bases for world aviation must be guaranteed security by all possible means so as to avoid the closing of these areas to foreign air companies. This is for the sake of the owners of the areas and the community of nations.
- 729. Unlimited territorial sovereignty over air space has been the creation of fallacious international thought as to its military and commercial necessity. The economic growth of international air transportation demands that a liberal policy be adopted towards the idea of air sovereignty; protectionism in aviation is incompatible with the liberalization of foreign trade.

B. Disarmament

- 730. Eisenhower's emphasis on the peaceful uses of atomic energy (in his 1953 speech to the U.N.) seems the most helpful way to ultimate disarmament. By concentrating on the constructive uses of the atom, agreement may later be reached as to its defensive and negative uses.
- 731. Disarmament as presently conceived will always be impossible so long as either the U.S. or the USSR is behind the other in weapon development, because neither nation is willing to freeze an adverse imbalance of power.

C. In general

- 732. Discusses human control of weather phenomena and the private law problems raised by such activity (personal injury, property damage, etc.).

D. Satellites

- 733. Basic plans have been formulated by International Telephone and Telegraph for the development of a world wide communications relay network for telephone and television messages and programs called END (Earth Net Dial) which would permit the instantaneous transmission of programs and messages from any part of the world to any other part.
- 734. Text of the Soviet announcements concerning the successful launching of Sputniks I and II with details of their flights.

E. Space travel

- 735. Human exploration of the moon would answer many questions concerning the formation of the earth and of the universe.
- 736. A technical exposition of the problems and solutions involved in a manned flight by space craft from the earth to Mars and return.
- 737. A short discussion of some of the problems to be faced when space flight and space exploration become realities, with reference to the partial solutions offered by Haley, Cooper, Jenks, Meyer, Peng, Schachter, and Heinrich.
- 738. Brief survey of technical problems connected with manned interplanetary flights, with the suggestion that all sciences ought to contribute to the realization of the astronautical problems involved.

AGREEMENT

A. Bilateral

- 739. The security requirement has been the main buttress of the present doctrine of exclusive sovereignty over superjacent air space. The negotiation of bilateral agreements to permit commercial exploitation of the air, necessitated by the doctrine of exclusive sovereignty, has been demonstrated to retard the development of international air transportation. The only way in which to resolve these two countervailing interests will be the adoption of international controls of the type envisaged by Eisenhower's "Open air" plan.
- 740. Exposition of Anglo-American treaties regarding rights of air space. (Ch. XII).
- 741. International rules governing air communications should:  
(1) further the development of air navigation as much as possible; but 2) not create a sense of injury or injustice from the rivalries which will necessarily result from the development of air navigation.

B. Conventions

a. In general

- 742. The substance and scope of the various air law conventions. Included are the conventions now superseded, presently in force, and planned as of 1951. (Ch. IV).

- 743. Existing conventions (1944) give to designated aircrafts of contracting states the "freedom of innocent passage" subject to the regulations and limitations embodied in the convention. This way states try to protect their legitimate state interest in the air space above their territory with the desirable freedom of air traffic.
- 744. International agreements dealing with air carriage; details of the Warsaw Convention, the Conditions of the International Air Transport Association, and the Rome Convention. (Ch. XVI).
- 745. History and detailed exposition of the international agreements concerning sovereignty of nations over their air space and the doctrine of innocent passage. Includes the Paris, Havana and Chicago Conventions, the United States position and the views of Dr. Albert Roper. See also: International Agreement.
- 746. The U.S. is not committed to any set definition of aircraft, since it has never ratified the Paris Convention. The Chicago Convention merely defines aircraft in an annex, which is not binding upon this country.
- 747. International agreements concerning rights of ownership and hire of aircraft. Details of the International Recognition of Rights in Aircraft Convention, the Convention Concerning Precautionary Arrest, the Salvage of Aircraft at Sea Convention, and the Draft Convention on Assistance and Salvage on Land. (Ch. XXV).
- 748. Review of international law and conventions covering air transportation. Details of the Chicago Convention, bilateral agreements, CITEJA, and the Warsaw Convention.
- 749. Full text of the following conventions:
  - Warsaw Convention (in French);
  - Int'l. Sanitary Convention for Aerial Navigation;
  - Rome Convention;
  - Convention Concerning Precautionary Arrest;
  - Salvage of Aircraft at Sea Convention;
  - Insurance Protocol to the Convention of Rome;
  - Air Fuel Tax Convention;
  - Chicago Convention;
  - Int'l. Air Transport Agreement;
  - Int'l. Air Service Transit Agreement;
  - Convention on the Int'l. Recognition of Rights in Aircraft.

b. Bermuda

- 750. Full text of the Bermuda Agreement between the United States and England, and of prior treaties between these two countries.



751. The Bermuda Conference was a compromise between the American policy of free competition in air transport and the British policy of tight international control. The Bermuda Conference accepted the principle of fair competition with only the ultimate limitation that home traffic is the primary objective in determining capacity. While many nations have been willing to accept the principles of the Bermuda agreement in their bilateral agreements, they are unwilling to extend these privileges to all other nations in a multilateral agreement.

c. Chicago

752. Exposition of the details of the Chicago Convention and the Rome Convention. (Ch. XII).
753. Presents the general background of the Chicago, Paris and Habana conventions.
754. The Chicago Convention confirmed existing international law that states have full sovereignty over air space above their respective territories.
755. The Chicago Convention confirmed international law in giving each state full sovereignty over air space above **its** territories.
756. The Chicago Convention dealt with those instrumentalities which derive support in the atmosphere from reaction of the air only and was not intended to deal with space in which flight by such an instrumentality is impossible.
757. The Chicago conference of 1944 resulted in a convention and three agreements. The convention continued the basic policy of the Paris convention in recognizing territorial sovereignty over superjacent air space, and established the ICAO. The agreements represented an attempt to lessen the existing restrictions on international commercial aviation, and have received little support.
758. Details of the Chicago Convention relating to airports. Includes international use of airports, right of search of foreign aircraft, financing, and floating airports. (Ch. XXIX).
759. The Chicago Convention is premised upon the idea of exclusive state sovereignty over its superjacent air space, with the operation of international air routes dependent upon the negotiation of bilateral agreements with the overflown states.
760. Discusses those provisions of the Chicago Convention which have the effect of preventing aliens from enjoying the benefits of the commercial privileges granted to the contracting state of the convention, and the present forms of these controls as they affect private aircraft and airlines operating international air services.

761. Both the Chicago Convention and theoretical doctrine would have given the USSR the right to protest to the high altitude balloon flights made by the U.S. over that country. The USSR, however, is not a signatory to that convention--the only positive law on the subject--and hence had no right to invoke the convention. Furthermore, the convention envisaged only commercial aviation, not high altitude balloons used only for scientific, inoffensive purposes at times of peace.
762. Although the USSR did not become a party to the Chicago Convention, the promulgation of the Soviet Air Code of 1932 made it clear that no basic difference exists between the position of the USSR as to air space sovereignty over its territorial lands and the position of those countries who were parties to the convention. As to sovereignty over air space superjacent to territorial waters, however, one basic difference exists: the Soviet code includes all territorial waters established by Soviet law, while the Chicago Convention limits territorial waters to those areas which are adjacent to the state's land territories.
763. Under Article 2 of the Chicago Convention and present international law, national sovereignty over air space extends to the air space over the territorial sea.
764. Article 5 of the Chicago Convention was intended to give operators of non-scheduled flights the right to carry them out without prior permission of the overflown state; the subsequent interpretation of Article 5, however, has rendered its provisions illusory.
765. The Chicago Convention forbids state aircraft to fly over the territorial area of another state without authorization, but allows such flights by civil aircraft not engaged in scheduled flight. The silence of the convention as to the privileges of military aircraft is due to a feeling that provisions dealing with such aircraft are out of place in a civil aviation convention.
766. Article 5 of the Chicago Convention covers three issues:
- 1) the right of entry and transit across territory of other contracting states for non-commercial non-scheduled flights.
  - 2) the right of entry and transit across territory of other contracting states for commercial non-scheduled flights.
  - 3) the privilege of carrying revenue traffic to and from territory of another contracting state.
767. Article 8 of the Chicago Convention does not impose upon the contracting states any additional duty, in regard to flights by pilotless vehicles, in addition to those imposed upon states by customary international law.

768. The proclaimed five freedoms of the Chicago Convention are:
- 1 - Freedom to free transit over territory of contracting states without any landing.
  - 2 - Right to land for non-commercial purposes.
  - 3 - The right to land passengers, mail and freight if they were taken aboard in the country under whose flag the plane flies.
  - 4 - The right to embark passengers, mail and freight if they are to be transported into the country whose flag the plane flies.
  - 5 - The right to take aboard passengers, mail and freight whose destination is the territory of any contracting state, and the right to land passengers, mail and freight coming from a contracting state.

d. Paris

769. International legislation in the field of public air law began for all practical purposes with the Paris Convention of 1919. That convention, premised on the theory of state sovereignty over air space, established regulations for aerial transportation which were controlling until superseded by the Chicago Convention of 1944.
770. The Paris and Chicago Conventions' principle of sovereignty in air space did not change prior law, but rather codified pre-existing customary law.
771. The author gives a detailed analysis of the Paris Convention and an account of the effectiveness and extent of that agreement.
772. National security was the dominant factor leading to the formulation of the doctrine of restrictive air space sovereignty of the Paris Convention. The significance of the convention is that it became the basis of almost all subsequent public international law of the air.
773. The Paris Convention gave the International Commission for Air Navigation far more power than the ICAO presently has. The Commission had truly legislative powers.

e. Rome

774. The Rome Convention and other international private law relating to aircraft insurance. (Ch. XXXII).

f. Warsaw

775. Under the Warsaw Convention, international air carriers are subject to three types of liability:
- 1) limited liability for damage to goods or passengers during carriage, subject to certain defenses,
  - 2) objective and unlimited liability during carriage if there is non-compliance with the Warsaw Convention,
  - 3) unlimited liability for willful misconduct or whatever is the equivalent under the lex fori.

C. In general

776. Exposition of various international agreements: the Two Freedoms and Five Freedoms; Bilateral Treaties: Chicago Type, British Type, and Bermuda Type; comparison of the Bermuda Plan with the Two Freedoms; the Bermuda Agreement; the International Sanitary Convention for Aerial Navigation; and the London Fuel Tax Convention. (Ch. XIV).

D. Multilateral

777. The hope for multilateral agreement as to commercial air rights still exists, but in fact almost all such agreements are made bilaterally.
778. There are grave dangers in leaving foreign nations entirely free to designate which airlines of another nation offering reciprocal privileges may fly to and from the nation because many nations have substantial economic investments in foreign flag airlines.
779. Centralized international regulation and multilateral agreements on air law are hampered by four different national interests:
- 1) the interest of some states in strict control over a nascent or rebuilding aviation industry;
  - 2) the interest of other states in a policy of laissez-faire over a highly competitive aviation industry;
  - 3) the interest of states with more air traffic than their aviation industry can handle;
  - 4) the interest of states occupying geographically strategic locations.

AGENCY

A. In general

780. Description of the nature and operation of the various international agencies, governmental and nongovernmental, defunct and existent. (Ch. V).

B. IAF

781. Summary of the objectives, history and achievements of the specialized agencies of the IAF.
782. A history of the IAF, with reference to its antecedents among the pre-war rocket societies, and a summary of the action taken by each of the International Astronautical Congresses.
783. The ultimate objective of the ARS and the IAF is to achieve international cooperation in the fields of rocketry and astronautics through official channels and governmental organizations.

- 784. Report on the Seventh Annual Congress of the IAF in 1956; election of new members, arrangements to serve as consultative international nongovernmental organization to UNESCO, establishment of working arrangements with the ITU (International Telecommunication Union), membership of the IAF in the CCIR, and greater contact with the ICAO.
- 785. The details, mostly social and anecdotal, of the 1957 IAF Congress in Spain at the time of the launching of Sputnik I.
- 786. The Eighth International Astronautical Congress, concerned about the legal implications of space flight, appointed a seven man committee to draft a definition of air space and recommend a rule which will delineate air space jurisdiction.
- 787. The VIII Congress of the IAF, meeting in Barcelona, may be best characterized as having placed emphasis on the organizational and business aspects of the federation. A committee to define the regions of jurisdiction of air law and space law was created, to be headed by Professor John Cooper.
- 788. Plans for the 9th Annual Congress of the IAF, and details of where Andrew Haley has lectured.

C. ICAO

- 789. Description of the nature and function of the ICAO. (Ch. V).
- 790. An extended description of the old Air Navigation Committee: its status, composition, functions and powers. Similar treatment is accorded to the present Air Navigation Commission of the ICAO, including discussion of regional work. To the article is appended a bibliography and an international review.
- 791. The ICAO has much less power than did the International Commission for Air Navigation under the 1919 Paris Convention which had truly legislative powers. The only duty imposed upon states by the Chicago Convention is to notify the ICAO of non-compliance.
- 792. The ICAO, established by the Chicago Convention, has as its primary responsibility the establishment of international technical standards and practices and procedures dealing with all phases of navigation, registration, and operation of civil aircraft. The ICAO has closely cooperated with other international organizations like the WMO and the ITU which are engaged in promulgating international technical regulations. In the interest of simplicity and to avoid confusion, however, an attempt should be made in the future to avoid the promulgation by two or more agencies of identical regulations with different legal status.

793. It is unlikely that the United States will agree to a centralized international control board under the ICAO to regulate international civil air traffic so long as this country can secure the five freedoms and other air transport economic rights by bilateral agreements. See also: Agreement - Bilateral.
794. There is widespread belief that the ICAO, as composed of members representing national interests, is not a proper judicial body for resolving disputes, and the United States has preferred to provide for arbitration in its bilateral agreements.

D. ITU

795. The ITU and ICAO have closely collaborated in promulgating radio regulations dealing with aircraft, and annex 10 of the ICAO primarily constitutes a reproduction of ITU procedures.

E. WIO

796. The WIO and ICAO have closely cooperated in promulgating International standards and practices in meteorology, but in the interests of efficiency and simplicity the responsibilities of each of the two respective organizations should more closely be defined.

BIBLIOGRAPHY (DESCRIPTION OF CONTENTS)

A. Air Law

797. Publications on international air law.
798. The Union List of Air Law Literature in the Libraries of Oxford, Cambridge and London.
799. Bibliography of air law literature available at Oxford, Cambridge & London.

B. ICAO

800. Index of ICAO documents.
801. List of ICAO publications.
802. A list of Serials Received in the ICAO Library.
803. Appended to this article on the Air Navigation Commission of the ICAO is a bibliography of works dealing with the ICAO & PICAQ.

C. Space

a. In general

804. Bibliography of space literature.

- 805. Bibliography of space science & exploration.
- 806. 300 titles on military aspects of space exploration.  
See also: Uses, military
- 807. References on the IGY. See also IGY
- 808. Bibliography on astronautical sciences and aviation in the U.S.S.R.
- 809. Description of recent (1956) fiction and nonfiction books dealing with astronautics.
- 810. A bibliography of German and other articles concerned with atomic energy, outer space research, etc., with a short discussion of the most important terms used in those articles.

b. Law

- 811. A list of about 300 books and journals dealing with space law.
- 812. Forty questions on space law. No answers are offered, but references are made to articles dealing with the problems posed by some of the questions.
- 813. An outline or classification of all the topics included in the field of space law.
- 814. Contains a bibliography of existing legal material about problems of outer space.
- 815. A bibliography of articles and books dealing with the problems to be encountered in formulating a law of outer space.
- 816. Oklahoma University is establishing a collection of materials on space law. Works are in all languages, and it is hoped that the collection will be the most comprehensive in existence.
- 817. A list of the scientific papers presented at a colloquium on the Law of Outer Space at the Hague on August 29, 1958.

c. Rockets, Missiles, and Satellites

- 818. Bibliography of jets, rockets & space exploration.
- 819. Bibliography of books & articles on satellites, missiles, rockets & space flight.
- 820. Bibliography on guided missiles, satellites and rockets.
- 821. 1500 titles on missiles, rockets and satellites.
- 822. Soviet bibliography on satellites and space flight.

- 823. Special bibliography of Air University works on earth satellites.
- 824. Bibliography of recent literature on artificial satellites.
- 825. 350 references on the history of artificial satellite.
- 827. 800 books on guided missiles.

#### GLOSSARIES

- 828. An encyclopedia devoted to defining and discussing technical aeronautical terms.
- 829. A dictionary of technical aeronautical terms.

#### LAW, GENERAL PRINCIPLES OF

##### A. Ad coelum doctrine

- 830. The ad coelum doctrine of private ownership is no longer used by the courts in dealing with air flights over property.
- 831. The ad coelum doctrine has been greatly misunderstood in English law. Its true meaning should be taken as giving the land owner exclusive ownership of the fixed contents of the superjacent airspace, and the right to fill that air space with contents. The doctrine should not be taken as bestowing unbridled license to the land owner to control superjacent airspace without limit, nor as denying to the landowner any rights in unoccupied airspace.
- 832. Cujus solum, a middle age doctrine wrongly attributed to Roman jurists who actually considered air as res communis, is today rejected in Anglo-American private law which considers air as community domain. The Napoleonic Code still embodying the notion of vertical appropriation of the air should be amended, to consider it res communis: it can be freely used without injury to others.

##### B. Air law

- 833. An outline of basic International Aviation Law, including discussions of the Chicago convention, the Paris convention, The Rome Convention, and the Warsaw Convention.
- 834. The English common law is frequently applied by analogy to problem of air law in England (CH.VII).
- 835. Brief survey of English air law, covering public and private law, adjective and substantive law, jurisdiction and choice of law, statutory and substatutory law, territorial scope, and history. (CH. VI-VIII).
- 836. The Administration of English Law relating to aviation and air transport services. (CH. IX-XI).



- 837. History of air law from 1782 - 1950, including national legislation and international agreements. (CH. I).
- 838. Description of English Law controlling the right to fly. Includes: personal injuries, nuisance, registration, marking, licensing, safety, war customs, and other statutory rules. (CH. XII).
- 839. English law on the establishment and operation of air transport services. Includes: regulations, licensing, miscellaneous provisions, and private law. (CH. XV).
- 840. English law governing carriage of passengers and goods. Problems of tort, contract, choice of law, common and private carriers, negligence and duty of care, special contracts of carriage, liability and limitations of liability, and rights and liabilities of third parties, delay, consignment, and death. (CH. XVII - XIX).
- 842. Discusses English common law of surface damage caused by aircraft, nuisance, collision, and other accidents (CH. XXII-XXIV), and the application of the Rome convention (XX-XXI).
- 843. English public and private law concerning commercial dealings in aircraft: ownership, sale, hire, charter, types of charter, loan, hire-purchase, mortgage, pledge bailment, repairs, maintainance, lien, manufacture, air advertising, towage, salvage and detention of foreign aircraft by civil process. (CH. XXVI).
- 844. The English law regulating airports; licensing, classification, charges, inspection, sanitation, functions of minister of civil aviation, liability of owners, flying schools and clubs. (Ch XXX-XXXI).
- 845. The English Law of aircraft insurance; nature of insurance contract, formation of contract, operation and effect of contract, performance, rights of third parties, compulsory insurance against third party surface liability under the Civil Aviation Act, other statutes. (Ch. XXXIII-XXXVI).
- 846. Full text of English statutes, statutory rules and orders, regulations and instruments, and maritime laws applied to aircraft.
- 847. Full Text of the General Conditions of Carriage of the International Air Traffic Association.
- 848. A review of air law with a plea for freedom of airspace for peaceful purposes.

849. Chapter I gives a short summary of current problems of Air Law (1944), and discusses conventions and agreements affecting the public as well as private sphere of air law in the time period before and after World War I. Chapter III gives a detailed account of the Paris convention of 1929, the Ibero-American agreement of 1926 and the Pan-American agreement of 1928. Chapter IV discusses the lack of a uniform system of international public air law, and contrasts this situation with the uniformity and universality reached in the field of private international air law.
850. Liability limits for damages caused by an air carrier engaged in international transportation are governed by three conventions: the Warsaw convention, and the two Rome Conventions of 1933. The former convention limits the liability of a carrier for injury to passengers, and the latter for damages caused by a carrier to third parties on the ground.
851. Discusses the rights of property owners affected by the overflight of aircraft under German law, with short references to English and American Law.
852. The general conflicts rule of lex fori for private air law leads to variations in scope and amount of liability. These rules do not bar forum shopping, but states are reluctant to recognize the competence of courts of other states and establish rules for exclusive jurisdiction.
853. No English case has as yet decided whether or not the mere flight of an aircraft over private property amounts to an actionable trespass. When the question is ultimately presented, it will in probability be settled by holding that although such a flight does present a trespass, it is actionable only if the flight is within the landowner's "zone of effective possession."

### C. International law

#### a. In general

854. It is imperative that the rule of law be applied in resolving international disputes.
855. The rule of law, rather than weapons, must provide the medium for solving the problems of the international community.
856. Exposition of the various theories of international law regarding rights in air space, the Chicago Convention the Rome Convention, and Anglo-American Treaties. (Ch. XII).
857. Although there is no positive international law on the mode of regulation of aerial intrusion, the author maintains that a prohibition against armed attack on airplanes irregularly penetrating prohibited territory is recognized.

858. A paper devoted to the defense of the adoption by Canada and the U.S. of the coastal Air Defense Identification Zone as being in accord with the tenets of International Law.
859. The formulation and the application of international law is governed by two countervailing factors: 1) the existence of pure legal theory, and 2) the political capability of the states involved. An example of the political factor at work is the recent use of block voting by nations at the Geneva Conference on the law of the sea; and example of when the political process cannot be reconciled with established principles of international law is the Girard Case. The interjection of such political factors into the formulation of international law is regrettable, but unavoidable.

b. Sovereignty

1. Air space

860. Freedom of the air space over the seas is derived from freedom of the seas, which doctrine is based essentially on the need of mankind to have free channels of international communications.
861. Only the air space above the open sea is free space. Each state has full and exclusive sovereignty over the air space above its land and sea territory.
862. Traces the growth of the principle of exclusive national sovereignty over superjacent airspace.
863. Just as coastal states have control over their seaports, every state today can control the volume of air transport which it will permit to enter its territory.
864. Politics is inseparable from discussions of freedom of the air since the economic strength of air routes is an instrument of political power in the same manner as sea routes are.
865. The constitutional questions posed by the question of Federal versus State jurisdictional control of airflight.
866. All the air space above the territory of a state should be within its sovereignty. To grant sovereign powers only to a limited height would involve great difficulties and give rise to numerous conflicts.
867. Freedom from any claim of sovereignty does not mean that the air space is not subject to any laws. Analogous to the free sea, the free air space is subject to legal norms regulating air traffic, etc. which have been agreed upon and exist within the air space.

868. States have claimed and exercised sovereign rights over their territorial air space as long as they have protected exclusive private property rights in such space under the maxim "cujus est solum." This idea begins with classical Roman law, continues through the Digests, the early French and German Codes and English and American common law.
869. Prior to World War I, two conflicting theories were advanced as to whether or not a state had exclusive sovereignty over its superjacent air space. The freedom of the air theory, derived from the Romans and developed by Grotius and Fauchille, was ultimately turned down in favor of exclusive state sovereignty. The chief exponent of the latter theory was Hazeltine.
870. Every state has exclusive sovereignty over its superjacent air space. This exclusive sovereignty, however, is limited by several established rules of international law: 1) intruding aircraft must obey all reasonable orders of the overflown state; 2) the overflown state must not subject the intruding aircraft or its occupants to any danger which is unreasonably great in relation to the apprehended harmfulness of the intrusion; 3) all aircraft have the right of entry when in distress or when such entry is caused by force majeure.
871. The doctrines of Grotius as to shipping on the high seas are today applicable to world transport. Just as no nation can exercise sovereignty over the high seas, no state can claim sovereignty over the airspace above these waters. The Chicago Convention has recognized this.
872. National sovereignty over the air will always be maintained so long as sovereignty on land is preserved in its present form. Sovereignty over the air is preferable to any other alternative despite the difficulties of enforcement demonstrated in the last war.
873. While a state's sovereignty over its airspace is the same as its sovereignty over its land and its territorial water, this doesn't mean that the extent of its sovereignty is the same for airspace as for the others, since different rules of international law affect these sovereignties. The basis for freedom of passage in territorial waters and international rivers has always been the need for communication. This principle applies even more rigorously to air. Freedom of passage in air is absolutely necessary to international communications. See also: Seas, Analogy to
874. The ultimate interests of all states, large or small, strong or weak, require that no state should forbid foreign aircraft to fly to or over its territory solely for reasons of economic protection, except for the reservation of purely national traffic to its own airlines.

875. Just as the state can extend its control beyond the three mile limit for security reasons (security of navigation, sanitary security, and general security), it can also control the airspace through which approaching aircraft travel.
876. For the protection of its security and fiscal interests, a state must have the same, if not more, rights in the air as it has at sea since the same interests are involved but to a greater extent.
877. The sovereignty of a state over the air space above its territory would not be contradicted if "freedom of innocent passage" would become a norm and tenet of international law, since such right would also constitute a recognized, allowable limitation of the exercise of sovereign powers by a state, not a limitation upon its sovereignty.

2. In general

878. Early French and Spanish discoverors relied heavily on religious ceremonies in claiming newly discovered territory for the homeland, although the English did not indulge in such practices. The importance of religion was due to the fact that the Papacy would grant these lands to the discovering nations in order to propagate the faith.
879. Effective occupation is an essential ingredient to the claim of a state to sovereignty over terra nullius. Discovery with symbolic possession alone has not been sufficient to establish legal title to terra nullius since the beginning of the 19th century.
880. In international law, effective occupation provides the only sufficient title of territorial sovereignty. However, effective occupation implies: 1) that symbolic annexation is sufficient (without occupation) to establish sovereignty over uninhabited and seldom frequented regions; 2) that total occupation is not required so long as there is power to maintain order, protect the inhabitants and preserve the boundaries; 3) geographic continuity gives full title besides effective occupation.
881. Rights of use and ownership are based on occupancy, which is composed of: 1) an act of control or dominance over the object and 2) intention of the occupant to appropriate the object to his own use. Since clouds are incapable of occupancy, they are not capable of private ownership, and must be considered as common property.

882. Balloon overflights are violations of the generally recognized rules of international law of state sovereignty in air space, as well as violations of Article 8 of the Chicago Convention prohibiting flights of pilotless airships without the specific permission of the subjacent country.

3. Polar regions

883. The freedom of the air space above the open sea and territories not belonging to any state is universally recognized and has become an accepted tenet of international air law.
884. A general discussion of the Soviet claims to the Antarctica, based on three theories: 1) discovery and occupation; 2) the Sector theory; and 3) the Condominium theory.
885. The Sector theory was first advanced as a method of determining sovereignty over the North polar areas. This theory would allow a state to claim all of the area between a base line connecting the meridians of longitude marking the limits of its easterly and westerly frontiers and extending through the pole, and has been said to originate in the "contiguity theory." Its proponents have been Lakhtine and Van der Heydte.
886. Sovereignty over the Antarctic is the subject of innumerable conflicting claims. Legal theories which have been advanced for the acquisition of sovereignty over Antarctica are: 1) discovery; 2) the Sector theory, as advanced by the European and South American states; 3) the Res Nullius Theory; and 4) the Common International Ownership theory. Exploration and discovery alone as a basis for sovereignty would lead to a mass of confusing and conflicting claims.
887. In the determination of what areas in the Arctic constitute the lands and territorial waters of any state over which the state has exclusive air space sovereignty, the normal rules of international law will apply. The "sector theory" is not a rule of international law, and sovereignty will be determined by whether or not the state has "effectively occupied" the land.

888. The former practice of giving a state sovereignty over contiguous land areas as well as the land area actually occupied, though not recognized generally in international law, is beginning to make its reappearance in the contiguity theory as used in asserting sovereignty rights over the arctic. The first advocate of this theory is Poirier, and the doctrine would allow those nations whose northern frontiers face the arctic to project their territorial sovereignty into the arctic region through the use of geographic sectors. Both Canada and the U.S.S.R. have based claims on this principle. If those claims are merely to the "lands and islands" within the sector, then such claims are very likely to be tacitly accepted. If, however, those claims are to also the ocean and ice filled waters, then they must be rejected as unworkable.
889. To resolve conflicting international claims to the arctic, it is suggested that an international convention be adopted in regard to such conflicting claims, adopting two principles: 1) The sector principle should be adopted to determine sovereignty over all existing lands and islands, subject to existing rights of foreigners; and 2) The sector principle should not apply to the oceans, frozen islands, or to superjacent air space over the oceans, or frozen spaces.

#### LEGISLATION

890. A bill to establish a Joint Committee on Extraterrestrial Exploration composed of 9 senators and 9 members of the House of Representatives to study problems concerning extraterrestrial exploration and travel.

#### SPACE, PHYSICAL CHARACTERISTICS OF

891. A description of the atmosphere's physical boundaries: the troposphere, statosphere, inosphere, and the exosphere, plus a description of the types of instrumentalities which have penetrated into outer space: Balloons, Rockoons, and Satellites. Also contains a footnote giving every headline appearing in the New York Times dealing with rockets or space during a seven month period.
892. Most people really refer to the troposphere (up to 10 km. above surface of the earth) when they refer to airspace. Immediately above the troposphere is the stratosphere (10 km to 40km) in which the highest planes and balloons have flown. Beyond that are the mesosphere, thermosphere and exosphere.

### III. INDEX

#### A. ABSTRACTS OF DIRECT DISCUSSIONS OF SPACE LAW

##### A

#### ACTIVITIES IN SPACE

##### commercial

benefits of - 17

financing of, see FINANCING

military supervision required - 16

##### financing of,

see FINANCING

in general - 91

interdependence of military and peaceful - 19, 20

liability for - 412

see also LIABILITY

##### military

prohibition of - 173, 220

##### peaceful

space should be used for - 73, 75, 173, 174, 176, 359, 389, 452

see also AGREEMENT; REGULATION OF OUTER SPACE

space law would promote - 187

should determine status of space - 121, 173-74, 401, 627, 644,

646-47, 649, 651, 653-57, 692

see also STATUS OF OUTER SPACE

political impact of - 185

regulation of, see REGULATION OF OUTER SPACE

scientific - 27

as determining status of space, see STATUS OF OUTER SPACE

survey of - 28

see also SATELLITES; ROCKETS; SPACE STATIONS

#### AD COELUM DOCTRINE

see LAW, GENERAL PRINCIPLES OF

#### AEROPAUSE

definition of - 545

#### AGENCY

##### function of

coordination of information - 47

communications - 46

exploration of space - 45

frequency allocation - 44

in general - 29

promote peaceful use of space - 29

registration - 53, 457-59

see also IDENTIFICATION

regulation of activities

navigation, communications, landing and take off - 48



AGENCY (continued)

function of (continued)

regulation of space - 29, 35, 49-51, 54, 58  
not important which agency regulates - 57  
see also ICAO, IAF, ITU, U.N., this title  
operation of space stations - 55, 56

IAF

should coordinate space research - 30  
should resolve legal status of space - 29

ICAO

position on IGY satellite overflights - 125  
regulation of space by:  
in general - 32, 34, 35, 37, 41  
should establish altitude boundaries - 31, 40  
international agreement required to authorize - 38  
use of as model agency - 51  
should not regulate space - 33  
non-membership of UCSR makes regulation by impossible - 39

IGY

as model space agency - 47  
see also IGY

ITU

should allocate frequencies - 44

U.N.

regulation of space by  
in general - 34, 35, 39, 58, 60-74,  
should establish altitude boundaries - 40  
registration of satellites - 465  
see also IDENTIFICATION  
not proper agency - 29

UNESCO

coordination of information - 73

AGREEMENT

content

see scope of, this title

convention

see CONVENTION

disarmament, role of - 97, 101

role of dispute in reaching - 105

need of enforcement - 103

express agreement desirable - 104

through international conference - 106-7

lawyers, role of - 170

developed through necessity - 182

need for - 130-32, 135-36, 147-49, 151, 178-79, 185, 187

premature at this time - 190, 192, 195

priority of issues - 153-60, 162-67

scientists, role of - 102

scope of

broad agreement unlikely - 105, 193

AGREEMENT (continued)

scope-of (continued)

boundaries - 75, 84, 134, 137

not subject to international agreement - 85

see also BOUNDARIES, ALTITUDE

cooperation in research

in general - 88-90, 93

U.S. and NATO countries - 94

political advantages of - 99

communications - 83, 84

financing - 91

frequency allocation - 77, 142

liability - 412

navigation - 83, 84, 145

observation satellites - 498

see also SATELLITES

regulation of space - 76, 78, 86, 91, 143-44, 176

retrieval and return - 80, 81

space flight - 149-50

status of outer space - 79, 97

weather control - 141

timing of, given scientific knowledge - 180-81, 188-89, 194

U.S., role of - 87, 92, 451

AIR FORCE

see AGENCY

AIR LAW

application by analogy, see ANALOGY

should govern landing and takeoff, see LANDING AND TAKE OFF

AIR SPACE, DEFINITION OF

see CONVENTION; SOVEREIGNTY

ANALOGY

in general

should be applied to space - 337

should be applied to space with care - 317, 332

not applicable to space - 84, 158, 334-35

Antarctica

legal regime should apply to celestial bodies - 203

see also CELESTIAL BODIES

not applicable to space - 364-65

air law

should apply to space - 12, 313-14, 316

should govern flight in air space only - 315

not applicable to space 319-30, 338

liability

should be analogized to air craft - 427

should be analogized to atomic activity - 425

maritime law

should apply to space - 285, 321, 339-44, 360, 363, 603, 661

methods of solution will apply to space - 402

space stations are analogous to sea dromes - 480, 488-93

should be applied with care - 345

not applicable to space - 349-59, 361-62, 452, 661

radio law - 336

ANTARCTICA

see ANALOGY

AMERICAN SOCIETY OF INTERNATIONAL LAW

1956 meeting - 673

APPLICATION BY ANALOGY

see ANALOGY

ATMOSPHERE, AS LIMIT OF STATE SOVEREIGNTY

see BOUNDARIES, ALTITUDE

ATMOSPHERIC LIFT, AS LIMIT OF STATE SOVEREIGNTY

see BOUNDARIES, ALTITUDE

ATTRIBUTES OF SOVEREIGNTY

see SOVEREIGNTY

B

BALLOONS

overflights by, see OVERFLIGHTS

BOUNDARIES, ALTITUDE

criticism of drawing - 655, 692

height of

activity as determining - 644

arbitrarily determined - 654

7 miles

100 miles - 606

150-225 miles - 609

200-300 miles - 626

300 miles - 604

500 miles - 603

310-620 miles - 605

should not be arbitrarily determined - 565-66

atmosphere, limit of - 514-16, 540, 542-44, 546, 554

atmospheric lift, limit of - 512, 541, 549-52, 573

unsatisfactory because of shifting boundary - 553

contiguous zone theory - 555-56

criticism of - 561-63, 653

effective control theory - 520, 564, 567-69

premise of Chicago convention - 274

not premise of Paris convention - 311

criticism of - 565, 572-79

elliptical satellite orbit should be taken into consideration - 589

gravitational field of earth - 582-84

should be absolute height of - 564

criticism of - 585-87

in general - 551

high enough to forbid missile passage by neutral - 630

no limit to height of - 526

impossible to determine - 633

international agreement to determine - 75, 84, 137

international convention to determine - 152

international legislation to determine - 134

BOUNDARIES, ALTITUDE (continued)

height of (continued)

- ionosphere, limit of - 602
- ICAO should determine - 31, 40
- political factors as determining - 614-23, 625-26
- security as determining, see political factors, this title
- survey of theories of - 591-96
- time, importance of in determining - 618
- U.N. should determine - 31, 40
- von Karman line - 31, 635-42
  - criticism of 643
  - effect of X15 upon, see X15
- effect of IGY upon - 122
  - see also IGY
- need for - 608-609
- premature at this time - 159, 162, 167, 192, 702
- spatial solution not adequate - 615-16
  - see also SOVEREIGNTY

BOUNDARIES, VERTICAL

- problems in drawing - 634, 680, 683, 685-88

BRAZIL

- position of on satellite overflights - 123

C

CELESTIAL BODIES

- analogies should not apply to - 202
- claims to
  - discovery doctrine will apply - 218
  - effective occupation doctrine will apply - 225
    - will not apply - 204, 215, 221
  - natural resources, see natural resources, this title
  - traditional sovereignty doctrines will apply - 224
  - sovereignty doctrines should not apply - 222
- colonization of
  - environment will aid survival - 244
  - nature of colonies - 245
  - will require new laws - 243
- exploration of
  - in general - 226
  - under auspices of U.N.
- metalaw,
  - see other beings, this title
- military use of - 220
- moon, see MOON
- natural resources
  - should belong to discovering nation - 219
  - impact on earth - 227
  - U.N. should have title to - 198
- occupation of, see claims to, this title
- other beings
  - contact with will stimulate human development - 248
  - metalaw, theory of - 254-56, 258
  - nature of - 250

CELESTIAL BODIES (continued)

other beings (continued)

- when may be termed human - 249
- new laws to deal with necessary - 252, 257
- must be treated with fairness - 253
- problem of too remote for attention - 246
- warfare with - 247
- when should be approached - 226
- sovereignty over, see claims to; status of, this title
- status of
  - analogous to Antarctica - 203, 205
  - analogous to high seas - 206
  - should be placed under international jurisdiction - 221
  - should be placed in hands of international trustee - 199
  - need for deciding - 230
  - no need for deciding - 196
  - not capable of solution - 207, 209
  - not subject to national appropriation - 208, 210, 212-14, 216-17, 220
  - res communis - 208, 210, 212-14, 216-17, 220
  - U.N. should have control of - 200-201
  - U.S. should take no position on - 202

CESSATION OF TRANSMISSION - 77

see also FREQUENCY ALLOCATION

CHICAGO CONVENTION, see CONVENTION

CODIFICATION OF SPACE LAW

see LAW

COMMERCIAL ACTIVITIES, see ACTIVITIES

COMMUNICATIONS

- coordination by agency, see AGENCY
- frequency allocation, see FREQUENCY

CONFLICT OF LAWS

- agreement necessary - 136
- in general - 378
- jurisdiction of events on board
  - law of launching state should govern - 259-61, 263-64, 267, 269
  - analogous to ships and airplanes - 262
  - existing laws cannot be given extraterritorial application - 265-66
- satellite subject to laws of flag state - 462-63, 465, 467

CONTIGUOUS ZONE

see BOUNDARY, ALTITUDE

CONTROL OF SPACE

- extent to which control possible - 2
- by U.S. and USSR - 437
- effective control theory, see BOUNDARY, ALTITUDE

## CONVENTION

### need for

- rules of satellite registration - 464
- determine status of space - 152
- regulate use of space - 177
- see also AGREEMENT

### Chicago

- aircraft, definition of - 281-82, 292
- airspace, definition of
  - limit of atmospheric lift - 272-73, 276-78, 280, 297, 309-11, 569
  - not limited to height of atmospheric lift - 307-8
  - area in which there is atmosphere present - 511, 515-16, 554
  - premised on maxim cuius est solum - 305
  - extends sovereignty to place of effective control - 274
  - no indication of meaning - 290-91, 298
- Article 8 applicable to missiles and satellites - 302
- should be revised to apply to spacecraft - 108, 299-301
- has no bearing on space - 270-73, 283-89, 292-94, 296, 344, 399

### Paris

- airspace, definition of
  - limit of atmospheric lift - 276, 309-11
  - premised on maxim cuius est solum
- no bearing on status of space - 270-71

### Rome

- application to space-liability problems - 426

CONVERTIBLE AIRCRAFT, see X-15

## COOPERATION IN RESEARCH

see AGREEMENT

## COPYRIGHT

problems of in space - 377

## CUJUS EST SOLUM. . .

see LAW, GENERAL PRINCIPLES OF

## D

## DISARMAMENT OF SPACE

- in general - 439-40
- role of inspection - 450
- methods of - 447
- not permanent solution to restricting space to peaceful uses - 444
- problems of - 446
- must be accompanied by elimination of foreign U.S. bases - 442-43
- U.S. has endorsed - 441

## DISCOVERY, DOCTRINE OF

see CELESTIAL BODIES

## DUE CARE

see LIABILITY

E

EFFECTIVE OCCUPATION  
see CELESTIAL BODIES

ENFORCEMENT  
as consideration in determining scope of agreement - 103

EXPLORATION  
see CELESTIAL BODIES; ACTIVITY

F

FINANCING  
agreement required, see AGREEMENT  
private financing - 6  
public financing - 7  
regulation of - 5, 8

FLAG STATE  
see IDENTIFICATION

FLIGHT PLANS, REGISTRATION OF  
see IDENTIFICATION

FREQUENCY ALLOCATION  
agreement required - 77  
should be given priority solution - 166  
see also REGULATION OF SPACE

I

IDENTIFICATION  
need for - 456  
registration of satellites  
not necessary - 468  
method of - 461  
satellites should have flag state - 462-65, 467  
in general - 460  
flight plans - 457-59

INNOCENT PASSAGE  
application to space - 523, 533, 628

INTERDEPENDENCE OF ACTIVITIES  
see ACTIVITIES

INTEREST OF SUBJACENT STATE  
as determining limit of sovereignty, see SOVEREIGNTY

INTERFERENCE  
between spacecraft and aircraft - 139, 469-70

INTERNATIONAL AGENCY  
see AGENCY

INTERNATIONAL COURT OF JUSTICE

should resolve disputes over space - 379-83, 422

INTERNATIONAL LAW

application to space

will provide basis for space law - 394, 401

only doctrines governing inter-personal relationships applicable - 376

inadequate to handle disputes over space - 384, 386-89, 392-93, 395-96,  
398, 400

freedom of innocent passage should be embodied as norm of - 369, 371

private person cannot violate - 373

sovereignty as principle of - 504-7

see also SOVEREIGNTY

IGY

history of - 110

participants only expressly agreed to IGY overflights - 119, 120-24, 126-27

participants tacitly agreed to all overflights - 111-16

as model for space agency - 47

IONOSPHERE

as limit of sovereignty

see BOUNDARY

ITU

see AGENCY

K

KARMAN, VON

see BOUNDARIES, ALTITUDE

L

LANDING AND TAKEOFF

airlaw should govern - 109

doctrine of innocent passage should apply - 523, 628

doctrine of innocent passage should not apply - 533

regulation of - 13

LAW

ad coelum doctrine not applicable to space - 366, 399, 528, 571, 613,  
659, 670-71

application by analogy, see ANALOGY

metalaw, see CELESTIAL BODIES

natural, see NATURAL LAW

other beings, see CELESTIAL BODIES

LAWYERS, ROLE OF - 170-71

LEGAL STATUS OF OUTER SPACE

see STATUS OF OUTER SPACE



## LEGISLATION

### international

- required to determine boundaries - 134
- required to regulate navigation - 145
- need for - 147
- review of since Chicago convention - 275

### U.S.

- National Aeronautics and Space Act, scope of - 406-10
- outline of all U.S. legislation dedline in space - 405
- no extra-territorial application to space - 265-66

## LIABILITY

### in general - 426

- disputes should go to International Court of Justice - 422
- not priority problem - 425
- need for study of risks involved - 421

### insurance, role of - 420

### launching state should be liable - 416-17, 603

### limits should be imposed - 423-24

### application of Rome convention - 426

### theories of

#### absolute liability

should apply - 411

should not apply - 431

damage analogous to act of God - 418

activity involved should determine - 412

dangerous instrumentality doctrine should apply - 413-15

need for determination - 428-29

negligence not applicable to space - 330

## LIFE ON OTHER PLANETS

see CELESTIAL BODIES

## M

## MAIL

use of satelllites for - 471

## METALAW

see CELESTIAL BODIES

## MILITARY

activities, see ACTIVITIES

## MOON

### claims to

doctrine of discovery will apply - 231-233

U.S. radar contact in 1946 furnishes basis for claim by discovery - 232

doctrine of discovery not applicable - 241

effective occupation as determining - 211-235

requirements of - 236

should be placed under international control - 238

nuclear bombs should not be exploded upon - 228

should be administered by U.N. - 239

U.N. draft declaration concerning status of - 240

N

NATIONALITY

of satellites, see IDENTIFICATION

NATURAL LAW

should form basis for space law - 384, 391-93, 395

NATURAL RESOURCES

celestial bodies, see CELESTIAL BODIES

NAVIGATION

need for international agreement concerning - 145

NEGLIGENCE

see LIABILITY

NOTICE OF LAUNCHING

see IDENTIFICATION

O

OBSERVATION, see SATELLITES

OCCUPATION, EFFECTIVE, see CELESTIAL BODIES; MOON

OPEN SKIES DOCTRINE, see UNITED STATES

OTHER BEINGS, see CELESTIAL BODIES

OVERFLIGHTS

balloons

in general - 529-31

satellites

air law should govern - 314

Chicago convention has no bearing upon - 287

as violation of national sovereignty - 537, 610, 659

lack of protest indicates acceptance of space as free - 146

see also BOUNDARIES, ALTITUDE; SOVEREIGNTY

P

PLANETS, see CELESTIAL BODIES

PRIVATE ACTIVITIES, see ACTIVITIES

R

RADIO, see FREQUENCY ALLOCATION

REENTRY, see LANDING AND TAKEOFF

## REGULATION OF SPACE

- agency to regulate
  - air force - 59
  - ICAO - 35, 41
    - non-membership of USSR makes regulation impossible - 39
  - International agency - 49, 50, 52-53, 59
  - U.N. - 35, 39, 58, 60-74, 668
  - not important which agency regulates - 57
  - see also AGENCY
- frequencies
  - ITU should regulate - 44
- need for - 182
- agreement over should precede space flight - 185
- must await scientific data - 184, 194

## RELIGION

- attitude towards space flight - 3

RES COMMUNIS, see SATELLITE; STATUS OF OUTER SPACE

## RETRIEVAL AND RETURN

- in general - 80, 81, 269

## ROCKETS

- military potential of - 434

## S

## SATELLITE

- communications, should be controlled by agency - 46
- overflights
  - IGY nations have agreed to - 111-16
  - consent to IGY flights not tacit acceptance of future flights - 119-21, 124-27
  - lack of protest indicates acceptance of overflights - 372
  - not within innocent passage doctrine - 533
- registration of, see IDENTIFICATION
- retrieval and return
  - recovery state under no obligation to return - 501-2
- status of
  - need for agreement - 477
  - analogous to sea drome - 480
  - analogous to stateless territory - 478
  - states have legitimate basis for launching - 475
  - no right of unlimited launching - 473
  - need for determining - 610
  - not res communis - 476, 479, 486
  - res nullius - 375
- trustee - 503
- uses
  - military - 433
  - observation
    - need for agreement - 498
    - should be allowed - 499
    - not violation of subjacent state sovereignty - 624
    - governmental right to protest - 500

SATELLITE (continued)

uses (continued)

observation (continued)

consistent with U.S. open skies proposal - 496-97  
radio relay and television - 471-72  
scientific - 27

SCIENTISTS, ROLE OF - 102

SECURITY

makes maritime doctrines inapplicable to space - 356, 359, 362  
as justification for sovereignty over airspace, see SOVEREIGNTY

SEA DROMES

space stations as analogous to, see SPACE STATIONS

SOVEREIGNTY

air space

definition of - 509, 511-16, 550, 599  
analogous to three mile limit - 519  
as principle of international law - 504-5, 507  
political justifications for - 508, 518, 529  
should be modified to reflect national interests - 522

attributes of - 521, 534-36, 538, 547, 598

celestial bodies, see CELESTIAL BODIES

means of enforcement not necessary - 632

outer space

should not extend to - 663, 671, 678-84, 690, 692-99, 709, 712, 715-22  
would stop space activity - 679

SPACE

definition of - 540-41, 666-67

exploration of

should not be under military control - 23  
emphasis should be on peaceful use - 23

legal status of, see STATUS OF OUTER SPACE

resources

should be used for all nations - 22  
see also CELESTIAL BODIES

zones beyond atmosphere - 600

SPACE CRAFT

missiles

not aircraft within Chicago convention - 281

nationality of - 259

law governing

air law - 262, 313-15

law of launching state - 259-61, 263-64, 267, 269

maritime law - 262

no extraterritorial application of U.S. law - 265

see also CONFLICT OF LAWS

SPACE FLIGHT

commercial

benefits of - 17-18

military supervision required - 16

SPACE FLIGHT (continued)

- financing, see FINANCING
- political impact of - 21
- regulation of
  - in general - 11-12
  - landing and takeoff, see LANDING AND TAKEOFF
  - national self interest should not be determining - 10
  - need for agreement - 149-50
- religious attitude toward - 3

SPACE STATIONS

- military potential of - 432-33
- international agency should operate - 55-56
- status of
  - analogous to sea dromes - 488-93
  - free for use by all - 487
- U.S. should be first to launch - 432
- use of - 483

STATUS OF OUTER SPACE

- activity as determining - 121, 173-74, 401, 627, 644, 646-47, 649, 651, 653-57, 692
- agency to determine
  - air force - 59
  - IAF - 29-30
  - ICAO
    - should determine 32, 33
    - not capable of determining - 33
  - U.N.
    - should determine - 34, 36, 106-7, 668
    - not capable of determining - 29
- need for agreement concerning
  - in general - 100, 130, 132, 135, 147, 151
  - bilateral agreement - 193
  - agreement should await actual dispute - 186, 192
  - must await scientific knowledge - 180-81, 194
- celestial bodies, see CELESTIAL BODIES
- existing conventions have no bearing - 270-73
- see also CONVENTIONS
- free for use by all
  - in general - 146
  - should be free - 51, 75, 603, 677-78, 680-84, 690, 692-98, 703-7, 709-13, 715-22
- effect of IGY upon - 111-22, 124-27
- need for determining
  - in general - 133, 146, 148, 161, 611, 689
  - before nations find individual answers - 178-79
  - before space is used for military uses - 455
  - to shift technology from military to civil - 187
- not yet determined - 135, 542
- political factors as determining - 95-96, 652, 682
- should not be political decision - 97, 151
- not priority problem - 153, 157-58, 160, 164
- res communis - 172, 631, 675, 703-7, 711, 713
- res nullius - 650
- security as determining, see political factors as determining, this title
- sovereignty doctrines not applicable - 663-64

T

TIME, IMPORTANCE OF

- generally - 402-4
- in determining altitude boundaries - 618, 657

TRUSTEESHIP

- celestial bodies, see CELESTIAL BODIES
- satellite, see SATELLITE

U

UNITED NATIONS

- should create space agency, see AGENCY
- should regulate exploration of celestial bodies - 212
- should have jurisdiction over celestial bodies - 200-1
- should have title to all planetary resources - 198
- charter should apply to space - 383
- should prohibit military use of space - 646
- should administer moon - 239
- draft declaration concerning moon - 240
- should have jurisdiction over space - 668
- space police force, need for - 629

UNITED STATES

- should take lead in sponsoring agreement - 92
- should treat celestial bodies analogously to Antarctica - 205
- should take no position on sovereignty of celestial bodies - 202
- cannot achieve control of space - 437
- cooperation in research with NATO countries - 94
- disarmament
  - has endorsed as step in peaceful use of space - 441
  - must give up foreign base as aspect of - 442-43
- legislation
- no extraterritorial application - 265-66
  - see also LEGISLATION
- satellite observation as consistent with Open Skies doctrine - 496-97
- peaceful use of space
  - should promote agreement upon - 451
  - should agree with USSR to use space for - 87
  - should not make exploration subordinate to military activities - 438
- precluded from claiming sovereignty beyond 300 miles - 122
- should launch first space station - 432

USES, see ACTIVITIES

V

VON KARMAN LINE, see BOUNDARIES, ALTITUDE

W

WEATHER - 141

X

X-15  
impact on boundary - 553, 643

B. ABSTRACTS OF WRITINGS OF COLLATERAL RELEVANCE TO SPACE LAW

A

AD COELUM DOCTRINE - 830, 831, 832, 868

AGENCY

IAF

details of - 781  
history of - 782  
objectives of - 783  
Seventh Annual Congress - 784-85  
Eighth Annual Congress - 786-87  
Ninth Annual Congress - 788

ICAO

collaboration with ITU - 795  
collaboration with WMO - 796  
description of - 789  
Air Navigation Commission - 790  
functions of - 792, 794  
powers of - 791  
publications and documents of - 800-1  
publications concerning - 803

IGY

bibliography of literature concerning - 807

international

description of existing agencies - 780

ITU

collaboration with ICAO - 795

WMO

collaboration with ICAO - 796

AGREEMENT

in general - 776

bilateral

retards development of air transportation - 739

Convention, see CONVENTION

multilateral

difficulty of obtaining - 779

in general - 777

treaties regulating use of air space - 740

AIRCRAFT

U.S. not committed to set definition of - 746

AIR LAW

in general - 839-40, 843-44, 849, 851, 853

administration of - 836

bibliography of literature concerning, see BIBLIOGRAPHY

conflict of laws - 852

history of - 837

insurance - 845

liability - 841-42, 50

relation to common law - 834

survey of - 833, 835, 838, 848



ANTARCTICA

sovereignty over, see SOVEREIGNTY  
Soviet claims to - 884

BIBLIOGRAPHY

air law - 797-99, 802  
ICAO  
documents and publications concerning - 803  
documents and publications of - 800-1  
IGY - 807  
rockets, missiles and satellites - 818-25, 827  
space  
in general - 804-5, 809-10, 816-17  
legal problems of - 811, 814-15  
military aspects of - 806  
Russian astronautical sciences - 808

COMMUNICATIONS - 741

CONVENTIONS, EXISTING

in general  
innocent passage as tenet of - 743  
scope of - 742, 744, 747-48  
Air Fuel Tax, text of - 749  
Bermuda  
text of - 750  
details of - 751  
Chicago  
text of - 749  
details of - 745, 748, 752-53, 757-58  
provisions of article 5 - 766  
provisions of article 8 - 767, 882  
as codification of existing law - 754-55, 770  
confers sovereignty over air space above  
territorial water - 763  
five freedoms of - 768  
military aircraft not considered - 765  
premised upon concept of exclusive sovereignty over superjacent  
airspace - 759  
Havana  
details of - 745, 748, 753  
International Air Service, text of - 749  
International Air Transport, text of - 749  
International Recognition of Rights in Aircraft - 749  
International Sanitary Convention for Aerial Navigation, text of - 749  
Paris  
details of - 745, 748, 753, 771  
as codification of existing law - 770  
first international air law legislation - 769  
security as dominant factor of - 772  
Precautionary Arrest Convention - 749  
Rome  
details of - 744, 752, 774  
Salvage of Aircraft at Sea, text of - 749  
Warsaw  
text of - 749  
details of - 774-75, 748

DISARMAMAMENT - 730-31

EFFECTIVE OCCUPATION, see SOVEREIGNTY

EXOSPHERE, DEFINITION OF - 892

GLOSSARY

of aeronautical terms - 828-29

INNOCENT PASSAGE

embodied in existing Conventions - 743

as tenet of international law - 877

INTERNATIONAL LAW

application to space - 856

factors affecting - 859

importance of - 854-55

innocent passage as tenet of - 877

MESOSPHERE, DEFINITION OF - 892

MISSILES

bibliography of literature concerning, see BIBLIOGRAPHY

OVERFLIGHTS

balloons

as violation of article 8 of Chicago Convention - 882

ROCKETS

bibliography of literature concerning, see BIBLIOGRAPHY

SATELLITES

bibliography of literature concerning, see BIBLIOGRAPHY

Sputniks I and II, technical details of - 734

telephone relay - 733

SOVEREIGNTY

air space

in general - 861, 863, 866, 868

comparison with state sovereignty over land and water areas - 873

desirability of - 872

economic factors affecting - 873

freedom of innocent passage - 877

history of - 862, 869

limitations upon - 867, 870

air space over open seas is free - 883

political factors affecting - 739, 864, 875-76

treaties regarding - 740

Antarctica

sector theory - 884, 889

Soviet claims to - 884

theories of - 867, 887-88

claims to new territory

contiguity theory - 888

effective occupation - 879-80

in general - 878

SOVEREIGNTY (continued)

claims to new territory (continued)

sector theory, see Antarctica, this title

clouds - 881

air transportation encouraged by liberal policy of - 729

SPACE

bibliography of literature concerning, see BIBLIOGRAPHY

physical characteristics of - 891, 892

SPACE FLIGHT

problems of - 736-38

THERMOSPHERE, DEFINITION OF - 892

TROPOSPHERE, DEFINITION OF - 892

UNITED STATES

not committed to accept any definition of aircraft - 746

USSR

astronautics, bibliography of literature concerning - 808

role of in civil air transportation - 727

satellites, bibliography of literature concerning - 822

Soviet Air Code of 1932, details of - 762

WEATHER

legal problems of controlling - 732

## IV. ABSTRACT-TO-SOURCE AND ABSTRACT-TO-FOOTNOTE TABLE

<u>Abstract Number</u>	<u>Source Number</u>	<u>Footnote Number</u>	<u>Abstract Number</u>	<u>Source Number</u>	<u>Footnote Number</u>
1	165	27	51	124	17, 139
2	60	27	52	103	17, 139
3	39		53	121	17, 139
4	168		54	100	17, 139
5	168		55	217	17
6	165		56	124	17
7	218		57	176	17
8	168		58	246	17
10	98		59	131	17, 136
11	100		60	49	17, 90
12	178		61	188	17, 129
13	168		62	158	17, 90, 129, 139
14	178		63	10	17, 90
15	168		64	124	17, 129, 139
16	37		65	123	17, 90, 129, 139
17	91	11	66	246	17
18	175		67	246	17
19	165	27, 111	68	246	17
20	165	111	69	111	17
21	91		70	136	17, 90, 130, 139
22	246		71	98	17
23	210	113	72	145	17
24	218		73	89	17
25	46	21, 110, 113	74	175	17, 90, 137, 138, 139
26	39		75	176	15
27	153		76	195	15
28	165	11, 12	77	247	15
29	142	17	78	246	15
30	199	17	79	75	15
31	99	17	80	17	15
32	140	17	81	247	15
33	142	17, 131	82	147	15
34	195	17	83	141	15
35	198	17	84	1	15
36	233	17	85	219	15
37	3	17, 131	86	268	15
38	45	17	87	157	15, 21
39	56	17	88	38	24
40	97	17	89	175	24
41	179	17	90	24	24
43	190	17	91	218	24
44	105	11, 17, 95, 131	92	158	24
45	141	17	93	219	24, 127
46	88	17	94	141	24
47	75	17	95	246	
48	123	17	96	246	
49	246	17	97	98	
50	148	17	98	165	

<u>Abstract Number</u>	<u>Source Number</u>	<u>Footnote Number</u>	<u>Abstract Number</u>	<u>Source Number</u>	<u>Footnote Number</u>
99	21		140	233	14, 72, 76, 77, 118
100	246		141	110	12, 14, 72, 77, 118
101	204		142	74	11, 14, 72, 77, 118
102	165		143	16	14, 72, 77, 118
103	18		144	119	14, 72, 77, 118
104	175	16	145	229	14, 72, 77, 118
105	165	16	146	210	14, 72, 77, 118
106	233	16	147	15	14, 72, 77, 118
107	105	16	148	19	14, 72, 75, 77, 114, 118
108	233	16	149	232	14, 72, 77, 118
109	252	16	150	218	14, 72, 77, 118
110	105		151	98	14, 72, 75, 77, 118
111	97		152	49	14, 72, 77, 118
112	247		153	246	72
113	246	35	154	246	
114	246	35	155	246	
115	246	35	156	136	
116	246	35	157	159	
117	175	36	158	20	
118	145	36	159	142	47
119	82	36	160	142	
120	69	36	161	145	
121	257	36	162	247	47, 82, 121, 128
122	267		163	159	
123	247	36	164	43	
124	13	36	165	43	
125	16	36	166	69	
126	20		167	247	
127	82	36	169	28	
128	121	14, 29, 72, 77, 114	170	15	117
129	38	14, 29, 72, 77, 118	171	198	117
130	98	14, 29, 72, 77, 118	172	246	98
131	49	14, 29, 72, 77, 118	173	69	
132	262	14, 29, 72, 77, 118	174	165	
133	43	14, 29, 72, 77, 118	175	134	
134	200	14, 29, 72, 76, 77, 118	176	141	
135	198	14, 29, 72, 76, 77, 118	177	196	
136	63	14, 29, 72, 77, 118	178	246	14, 72
137	246	14, 72, 77, 118	179	17	14, 72, 118
138	117	14, 72, 77, 118	180	246	14, 20, 72, 119, 120
139	247	14, 72, 77, 118	181	246	14, 72, 116, 119
			182	204	14, 72, 119
			183	75	14, 72
			184	247	14, 20, 72, 119, 120
			185	112	14, 20, 72
			186	13	14, 72, 116, 119

<u>Abstract Number</u>	<u>Source Number</u>	<u>Footnote Number</u>	<u>Abstract Number</u>	<u>Source Number</u>	<u>Footnote Number</u>
187	142	14, 20, 72, 118	239	140	8, 38
188	195	14, 20, 72	240	42	8
189	45	14, 72, 119, 120	241	3	8, 38, 89
190	9	14, 72, 119	242	195	8
191	221	14, 72, 119	243	174	8
192	228	14, 20, 47, 72, 116, 119	244	39	8
193	165	14, 72, 119, 120	245	39	8
194	175	14, 72, 119, 120	246	136	
195	247	14, 72, 119, 120	247	38	
196	247	8, 83, 93	248	90	
197	123	8, 83	249	9	
198	136	8, 83	250	39	
199	124	8, 83, 91	251	39	
200	136	8, 83, 91	252	148	
201	175	8, 83, 91	253	210	
202	13	8, 83, 86	254	140	
203	62	8, 83, 84	255	103	
204	165	8, 83, 86	256	72	
205	210	8, 83, 84, 86	257	88	
206	217	8, 83, 91	258	229	
207	182	8, 83	259	3	
208	220	8, 83, 91	260	257	96
209	246	8, 83	261	250	96
210	246	8, 83, 91	262	165	
211	246	8, 83	263	168	96
212	246	8, 83, 91	264	252	96
213	246	8, 83, 91	265	175	96, 97
214	246	8, 83, 91	266	4	96, 97
215	246	8, 86, 91	267	127	96
216	246	8, 91	268	168	96
217	246	8, 91	269	74	
218	134	8, 91	270	145	31, 33
219	217	8, 91	272	246	31, 34, 52, 53
220	194	8, 91	273	246	31, 52, 53
221	141	8, 86, 91	274	251	31, 63, 73
222	219	8, 86, 91	275	193	31
223	204	8, 85	276	19	31, 34, 52
224	126	8	277	61	31, 52, 53
225	124	8	278	118	31, 34, 52
226	97	8	279	98	31
227	174	8	280	49	31, 33, 34, 52, 53
228	259	8	281	197	31, 34, 52, 53
229	261	8	282	196	31, 33
230	246	8	283	185	31, 33
231	90	8	284	178	31, 33
232	126	8	285	164	31, 33
233	223	8, 86	286	163	31
234	109	8, 86	287	151	31
235	134	8	288	138	31, 33
236	201	8	289	123	31
237	257	8, 38, 89	290	63	31
238	204	8	291	140	31, 34
			292	20	31, 33, 34

<u>Abstract Number</u>	<u>Source Number</u>	<u>Footnote Number</u>	<u>Abstract Number</u>	<u>Source Number</u>	<u>Footnote Number</u>
293	70	31, 34	346	246	100, 106
294	69	31, 34	347	177	100
295	4	31	348	166	100, 106
296	159	31, 33	349	246	100, 106
297	250	31, 73	350	246	100, 106
298	186	31	351	165	100, 106
299	192	31, 44	352	69	100, 106
300	234	31, 44	353	92	100, 106
301	246	31, 44	354	177	100
302	86	31	355	250	100
303	45	31, 44	356	69	100
304	192	31	357	104	100, 106
305	202	31	358	18	100
306	114	31	359	246	100
307	115	31	360	220	100, 104, 106
308	246	31	361	20	100, 106
309	246	31, 33	362	64	100, 106
310	246	31	363	168	100
311	57	31, 33, 34	364	204	85, 100, 107
312	168	31	365	145	85, 107
313	252	100, 103	366	61	99
314	168	73, 100, 103	367	246	99
315	250	73, 100, 103	368	175	99
316	43	73, 100, 103	369	177	99
317	247	73, 100	370	202	99
318	160	73, 100, 108	371	177	99
319	250	100, 108	372	196	99
320	168	100, 103, 108	373	34	99
321	62	100, 108	374	75	99
322	145	100, 108	375	63	99
323	178	100, 108	376	246	99
324	147	100, 108	377	207	99
325	122	100, 108	378	25	99
326	28	100, 108	379	123	
327	246	100, 108	380	124	
328	177	100, 108	381	217	
329	61	100, 108	382	222	
330	147	100, 108	383	247	
331	246	100	384	100	
332	221	100	385	246	27
333	148	100, 116	386	265	27
334	98	100, 116	387	44	27
335	168	100, 116	388	29	27
336	213	100	389	74	98
337	219	100	390	246	98
338	147	100	391	235	98
339	267	100, 104	392	89	98
340	223	100, 104	393	88	98
341	147	100, 104	394	168	98
342	124	100, 104	395	98	98
343	255	100, 104	396	28	98
344	164	100, 104	397	147	98
345	175	100, 106	398	250	98
			399	246	98

<u>Abstract Number</u>	<u>Source Number</u>	<u>Footnote Number</u>	<u>Abstract Number</u>	<u>Source Number</u>	<u>Footnote Number</u>
400	170		450	165	10
401	145	98	451	141	10, 21, 115
402	165	98	452	217	10, 115
403	44	98	453	174	10, 115
404	41	98	454	168	
405	71		455	121	10
406	4		456	74	
407	19		457	165	
408	53		458	3	
409	167		459	247	
410	241		460	17	
411	168	9, 124	461	247	
412	219	9, 124	462	222	
413	252	9, 124	463	217	
414	178	9, 124	464	56	
415	252	9, 124	465	123	
416	124	9, 124	466	124	
417	145	9, 124	467	222	
418	155	9, 124	468	45	
419	15	9, 124	469	168	
420	81	9, 124	470	178	
421	247	9, 124	471	15	123
422	247	9, 124	472	105	123
423	168	9, 124	473	246	7
424	168	9, 124	474	178	7
425	165	9, 124	475	252	7
426	247	9, 124	476	178	7
427	252	9, 124	477	178	7
428	266	9, 124	478	252	7
429	168	9, 124	479	178	7
430	168	9, 124	480	178	7
431	257	9, 124	481	70	7
432	217		482	252	7
433	217	112	483	261	7
434	218	112	484	195	7
435	121	112	485	194	7, 94
436	82	112	486	252	7, 94
437	157		487	147	7, 94
438	212		488	203	7, 94
439	246		489	175	7, 94
440	111	10	490	30	7, 94, 95
441	13	10, 19, 21	491	134	7, 94
442	246	10	492	250	7, 94, 95
443	74	10	493	107	7, 94, 95
444	268	10, 19	494	37	7, 94
445	219	10	495	254	7
446	12	10	496	204	13, 126
447	31	10	497	131	13, 28, 126
448	178	10, 115	498	246	13, 28, 126
449	176	10, 115	499	63	13, 28, 126
			500	145	13, 28, 81, 126



<u>Abstract Number</u>	<u>Source Number</u>	<u>Footnote Number</u>	<u>Abstract Number</u>	<u>Source Number</u>	<u>Footnote Number</u>
501	175	125	549	50	30, 45, 49, 53, 59
502	155	125	550	49	30, 45, 49, 53, 59
503	165	140	551	215	30, 45, 49, 53
504	127	32	552	217	30, 45, 53
505	252		553	57	30, 45, 54, 70
506	246	32	554	36	30, 45
507	177	32, 40	555	211	30, 45, 50, 60
508	178	32, 40	556	156	30, 45, 50, 60
509	222	32	557	191	30, 45, 60
510	140		558	223	30, 45, 60
511	176		559	52	30, 45, 50, 60
512	220		560	56	30, 45, 50, 60
513	222		561	179	30, 45, 62
514	163		562	246	30, 45, 62
515	228		563	176	30, 45, 62
516	127		564	192	30, 45
517	126		565	267	30, 45, 65
518	177	40	566	144	30, 45
519	253	32	567	50	30, 45
520	164		568	271	30, 37, 45
521	143	26, 32, 40	569	192	30, 45
522	233		570	28	30, 45
523	257		571	134	30, 45
524	168	32	572	267	30, 45, 65
525	197		573	222	30, 45, 65
526	143		574	217	30, 45, 65
527	253		575	220	30, 45, 65
528	175		576	105	30, 45, 65
529	74	69	577	64	30, 45, 65
530	83	69	578	221	30, 45, 65
531	34	26, 69	579	138	30, 45, 65
532	203	71	580	177	30, 45
533	151	71	581	177	30, 45
534	252	41	582	148	30, 45, 48
535	51		583	28	30, 45
536	183	41	584	28	30, 45, 48
537	63		585	217	30, 45
538	250		586	64	30, 45
539	168		587	133	30, 45
540	145	4, 30, 37, 45, 57, 59	588	240	5, 30, 45
541	168	4, 30, 45, 57	589	246	5, 30, 45, 80
542	198	4, 30, 45, 57	590	177	5, 30, 45
543	246	4, 30, 45, 57	591	82	5, 30, 45
544	28	4, 30, 45	592	70	5, 30, 45
545	118	4, 30, 45	593	54	5, 30, 45
546	246	4, 30, 45, 57	594	109	5, 30, 45
547	177	4, 30, 45, 57	595	86	5, 30, 45
548	178	4, 30, 45, 57	596	134	5, 30, 45
			597	206	5, 30, 45
			598	177	5, 30, 45

<u>Abstract Number</u>	<u>Source Number</u>	<u>Footnote Number</u>	<u>Abstract Number</u>	<u>Source Number</u>	<u>Footnote Number</u>
599	250	5, 30, 45, 58	639	60	30, 45, 55
600	118	5, 30, 45	640	97	30, 45, 55
601	246	5, 30, 45	641	99	30, 45, 55
602	64	5, 30, 45	642	251	30, 45, 55
603	123	5, 30, 45	643	204	30, 45, 54, 56, 70
604	246	5, 30, 45	644	175	6, 109
605	34	5, 30, 45, 58	645	216	6
606	111	5, 30, 45	646	105	6
607	141	30, 45	647	17	6, 109
608	2	30, 45	648	134	6
609	178	30, 45	649	88	6
610	26	30, 45, 71, 74	650	226	6, 109
611	83	30, 45	651	74	6, 37
612	4	30, 45, 46	652	18	6
613	87	30, 45	653	196	6, 109
614	194	18, 30, 45, 78, 114	654	175	6
615	19	18, 30, 45, 66, 78	655	114	6
616	185	18, 30, 45, 66, 78, 114	656	89	6
617	82	18, 30, 45, 78	657	165	6, 109
618	165	18, 30, 45, 78, 114	658	82	6, 27
619	134	18, 30, 39, 45, 78	659	16	6, 35
620	221	18, 30, 45, 78	660	159	6
621	74	18, 30, 45, 78, 114	661	267	6
622	164	18, 30, 45, 78	662	3	6
623	82	18, 28, 30, 45, 66, 78	663	125	6, 43
624	178	18, 30, 45, 78	664	49	6, 43
625	192	18, 30, 45, 78	665	34	6, 43
626	173	18, 30, 45, 66, 78	666	163	6, 43
627	165	18, 30, 45, 66, 78, 114	667	258	6, 43
628	77	18, 30, 45, 78	668	138	6, 43
629	59	18, 30, 45, 78	669	252	6, 43
630	58	18, 30, 45, 78	670	246	6, 35, 43
631	114	18, 30, 45, 78	671	62	6, 43
632	192	18, 30, 45, 78	672	43	6, 43
633	176	30, 45	673	169	6, 43
634	88	30, 45	674	34	6, 43
635	223	30, 45, 55	675	27	6, 43
636	154	30, 45, 48, 55	676	246	6, 43
637	92	30, 45, 55	677	246	6, 43
638	104	30, 45, 55	678	194	6, 22, 43
			679	218	6, 22, 43
			680	179	6, 43
			681	252	6, 43
			682	252	6, 43
			683	127	6, 43
			684	23	6, 43
			685	246	6, 43
			686	246	6, 43
			687	246	6, 35, 43

<u>Abstract Number</u>	<u>Source Number</u>	<u>Footnote Number</u>	<u>Abstract Number</u>	<u>Source Number</u>	<u>Footnote Number</u>
688	246	6, 43	739	269	
689	246	6	740	227	
690	210	6	741	81	
691	16	6	742	227	
692	68	6	743	177	
693	242	6	744	227	
694	178	6, 79	745	152	
695	178	6, 79	746	18	
696	168	6, 79	747	227	
697	178	6, 79	748	208	
698	61	6, 40, 79	749	227	
699	250	6	750	227	
700	176	6, 42	751	256	
701	171	6	752	227	
702	57	6	753	89	
703	246	6, 88, 101	754	50	
704	136	6, 88, 101	755	87	
705	127	6, 88, 101	756	52	
706	246	6, 88, 101	757	135	
707	246	6, 88, 101	758	227	
708	252	6, 88, 101	759	269	
709	246	6, 88, 101	760	76	
710	217	6, 88, 101	761	234	
711	176	6, 88, 101	762	48	
712	7	6, 88	763	173	
713	250	6, 88, 101	764	79	
714	141	6, 88, 101	765	161	
715	148	6, 88, 101	766	33	
716	171	6, 88, 101	767	34	
717	188	6, 88, 101	768	253	
718	49	6, 35, 88, 101	769	135	
719	229	6, 88, 101	770	175	
720	147	6, 88	771	177	
721	88	6, 88	772	269	
722	246	6, 88	773	33	
723	222	6, 88	774	227	
724	219	6, 35, 88	775	33	
725	60	6, 88	776	227	
726	222	6, 88	777	256	
727	113		778	208	
728	80		779	33	
729	79		780	227	
730	46		781	102	
731	46		782	94	
732	11		783	95	
733	263	123	784	101	
734	236		785	231	
735	263		786	6	
736	249		787	93	
737	200		788	96	
738	5		789	227	
			790	153	

<u>Abstract Number</u>	<u>Source Number</u>	<u>Footnote Number</u>
791	33	
792	194	
793	208	
794	256	
795	194	
796	194	
797	130	
798	245	
799	120	
800	128	
801	129	
802	224	
803	153	
804	238	
805	162	
806	180	
807	132	
808	150	
809	40	
810	26	
811	116	
812	116	
813	116	
814	270	
815	120	
816	189	
817	263	
818	22	
819	66	
820	85	
821	181	
822	237	
823	65	
824	8	
825	149	
827	84	
828	23	
829	108	
830	243	
831	166	
832	171	
833	106	
834	227	
835	227	
836	227	
837	227	
838	227	
839	227	
840	227	
841	227	

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842	227	
843	227	
844	227	
845	227	
846	227	
847	227	
848	172	
849	177	
850	135	
851	78	
852	33	
853	244	
854	264	
855	209	
856	227	
857	202	
858	184	
859	14	
860	80	
861	178	
862	105	
863	47	
864	80	
865	67	
866	177	
867	177	
868	55	
869	135	
870	161	
871	47	
872	80	
873	80	
874	80	
875	173	
876	173	
877	177	
878	225	
879	230	
880	248	
881	260	
882	143	
883	177	
884	242	
885	32	
886	32	
887	48	
888	239	
889	239	
890	139	
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892	118	

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\* Contained articles by Loftus Becker, John C. Cooper, Admiral Chester Ward, Sir Leslie K. Munro, Paul G. Dembling, Admiral John E. Clark.